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SOME GENERAL SALON OBSERVATIONS

BY W. F. BRADLEY.

PARIS, Dec. 15.—Although the man who drives his own car is generally interested in an automobile from the radiator to the tail lamp, there are certain points which appeal to him with particular force. So long as the gearless engine is undiscovered we shall have to work with change-speed levers. More and more the gate type is coming into vogue, and although two or three prominent French firms stand by the "straight through" lever, they are in a splendid isolation, as is made evident by a study of the Paris Salon. San Giorgio, the Italian branch of the Napier, has a little metal plate covering up the reverse slot and preventing this gear being put in accidentally. It is intended especially to prevent the reverse being put in forgetfully, when the sprag is down.

Pedals generally have an increased surface and are invariably of the push forward type. There are a few examples of the leather-faced pedals, and an equally small number with a pivoted plate allowing the position of the foot to be changed without lifting it off the pedal. On one car the pedals had toe clips, like those used by cyclists. Italian builders, as a rule, adopt three very large pedals, the center one for the clutch, the two others for brakes on the differential. Acceleration pedals show a uniformity, broken by the San Giorgio in placing it on a metal footboard level with but outside the chassis. It is, of course, of the push down type, but without much forward movement.

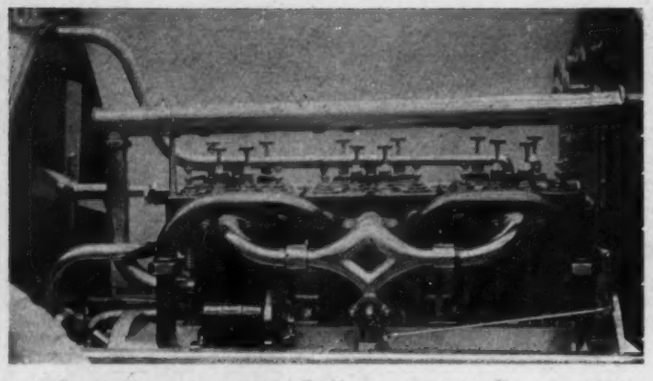
Spark and Ignition Levers.

Spark and ignition controlling levers have undergone few changes. There is a certain tendency to keep a fixed ignition point, leaving only a throttle, but the majority of makers have both levers with the usual type of sector. Argyll (British) has one sparking lever controlling both magneto and accumulator ignition. To pass from one ignition to the other the lever is pushed over to the opposite half of the sector. There are two sparking plugs in each cylinder and independent wiring for each system. Most makers content themselves with one set of plugs although providing double ignition. A few have made provision for double plugs in the cylinder casting, but nothing further.

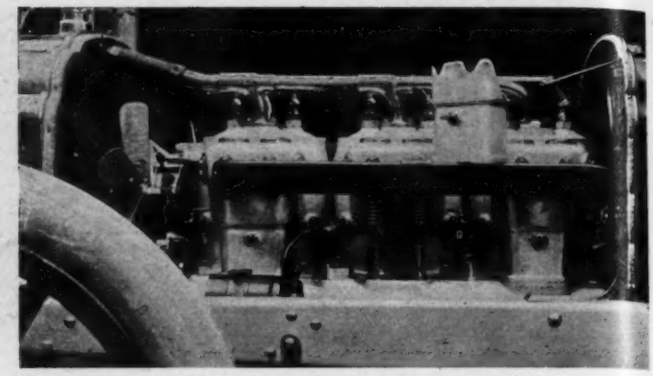
Dashboards Are Less Encumbered.

Dashboards are less and less encumbered with accessories, many of them being shown with nothing more than a sight-feed lubricator. There is also a tendency to make a sloping foot rest running into the dash. One machine was seen with dash and foot rest of this nature in one piece of metal, bolted to side

DEMONSTRATING CARS LINED UP OUTSIDE THE GRAND PALAIS, MORE NUMEROUS THAN EVER BEFORE.



HOW THE DARRACQ'S SIX-CYLINDER LOOKS.



VALVE TAPPET COVERS ON LEON BOLLEE.

frames. One of the neatest essence pumps shown at the Salon was on the Vinot and Degaingand car. It was hidden under the footrest forming dashboard, only a brass head protruding. By giving the pump head a half turn it was released and ready for pumping. Delaunay-Belleville had a heel pedal conveniently placed within reach of driver, on pressing down which the crankcase was filled with oil from a reserve tank under front seats. An indicator on the tank told when the oil supply was low. Daimler secured the automatic filling up of lubricating tanks from reserve supply by pulling a chain hanging within convenient reach of steering wheel.

Brakes Are Carefully Thought Out.

Brakes are better thought out and more carefully constructed than ever. In this branch Italy has a distinct lead, many of the braking systems being models of efficiency. Bianchi is a specially good example. The drums are wide and hollow and the brake bands are fitted with riveted jaws readily taken off and replaced by new ones when worn. Play on the brakes can be taken up in a second by a turn or two of a hand wheel. Some attempts have been made to use the engine as a brake, one of the most successful being the six-cylinder Léon Bollée.

Springs and Shock Absorbers.

Springs are improved all round, being longer than formerly, and in many cases three-quarter elliptic springs replace the transverse rear spring.

Shock absorbers, too, receive their full share of attention. The Metallurgique machines have the A. Mans shock absorber, consisting of cylinder on each side of chassis, with leather-covered piston united by a chain to longitudinal springs. When the chassis is lowered, the piston under the influence of a coil spring within the cylinder tends to compress the air found before it; this air passes behind the piston into the compression chamber. The Dumond shock absorber, fitted on Westinghouse cars, consists of a smooth inner cylinder fitted with liquid, and an inner spherical piston provided with holes for allowing the passage of the liquid.

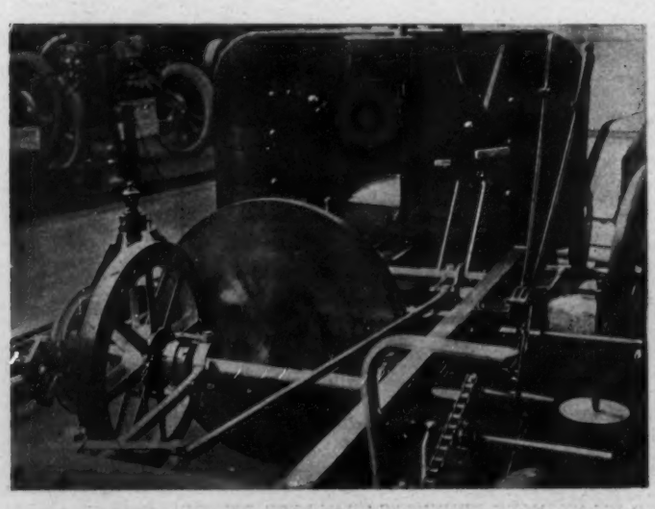
The Renault shock absorber is very simple, consisting of a cylinder fitted with incongealable oil in which moves a piston pierced by several holes. The liquid offers a certain resistance in passing from one side to the other of the piston and consequently the chassis cannot be moved abruptly either in one direction or the other. Panhard & Levassor employ the Krebs shock absorber, which has for its principle the friction of metal against metal under variable pressure.

Truffault suspension consists of two lever arms with an articulation formed by two friction plates, a male and a female, made in bronze, with the interposition of leather against metal. This friction articulation is regulated so as to offer a serious resistance to the opening or the closing of the angle of the levers, the ends of which are fixed to the chassis and the axle.

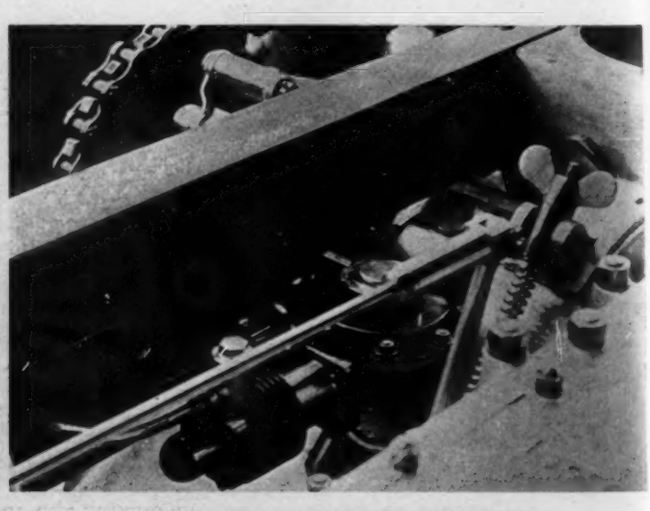
Self-Starters Are Numerous.

Self-starters are present at the Salon in big numbers. Mors maintains the principle of sending a compressed charge into the cylinders and firing it. Isotto Fraschini has an air pump driven from the countershaft and filling a tank placed across the chassis with air compressed to twelve atmospheres. Suitable piping leads to a distributer at rear of engine, which, on a foot pedal being depressed, allows the compressed air to enter the cylinders under compression. The inrush of air drives down the piston, putting the engine into motion. The air tank is tested up to twenty atmospheres, but has a safety valve allowing all pressure above twelve atmospheres to escape. The compressed-air valves are placed on the inlet side of the engine.

The Fiat self-starter is constructed on similar lines, the gear-driven, water-cooled air pump being carried above the distribu-



HOW THE TURICUM FRICTION DRIVE LOOKS.



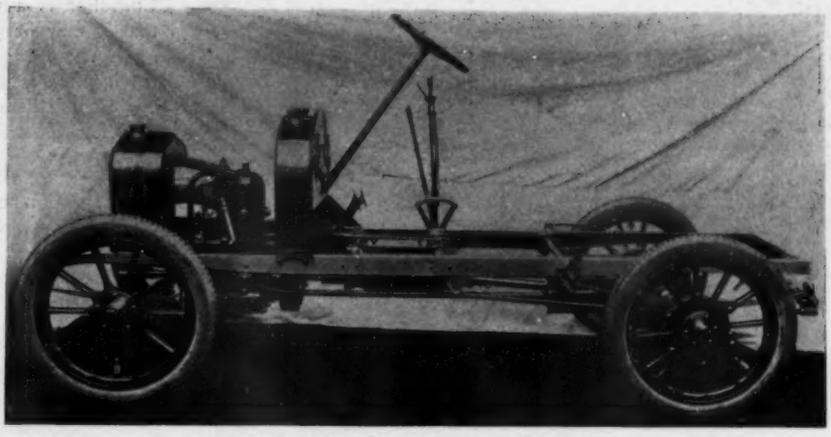
SELF-STARTER OF THE ISOTTA FRASCHINI.

tion gears and the compressed-air tank placed under side frame just behind the engine.

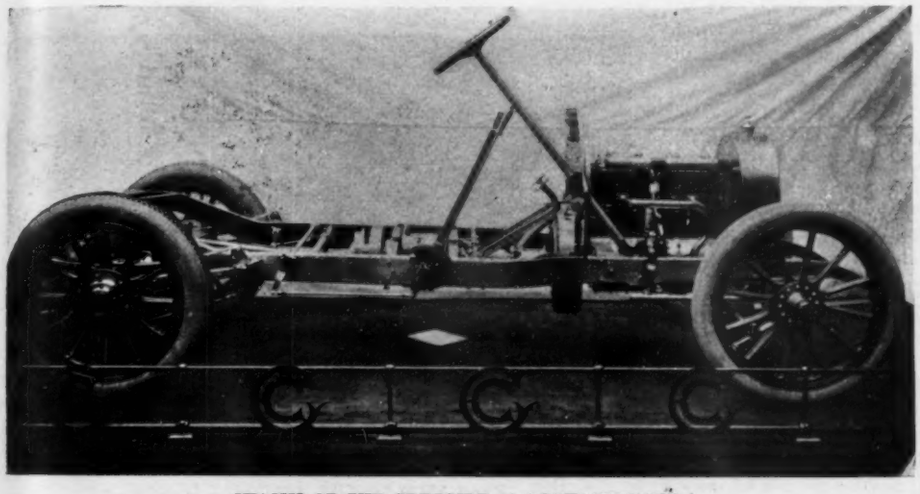
Renault has also a compressed-air self-starter, differing from the Italians in that no charge is sent into the cylinder, but is directed against an appliance geared up to the crankshaft.

A Revolving Radiator.

One of the curiosities of the show is a revolving radiator on a Bolide six-cylinder car. Within the frame of the radiator tank is a fan, the blades of which are formed of a number of copped tubes, terminating at each end in a tube of greater diameter. Each complete blade screws into the hollow hub, forming pump, from which there is a connection to each side of the radiator tank. The fan is driven by belt from the crankshaft, the water entering from one side of the tank, passing down the blades of the fan and leaving through the hollow bearing and piping to opposite side of tank. The usual gear-driven water-circulating pump is employed, assuring a circulation even if the fan does not move. The radiator attracted a great deal of attention and was one of the distinctive new things shown.



DELAGE SINGLE CYLINDER VOITURETTE.



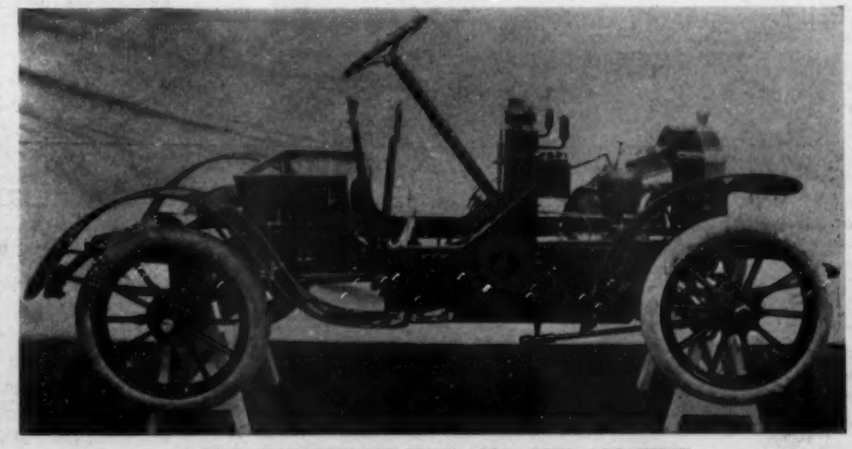
CHASSIS OF THE GREGOIRE, A POPULAR MAKE.

BODY WORK AT PARIS SALON.

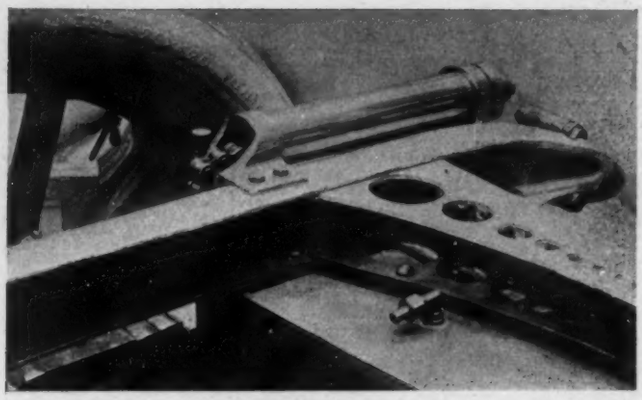
PARIS, Dec. 15.—There are no radical changes in the types of automobile bodies shown at the Paris Salon. Neither are there any freak bodies more suited for acting as a permanent residence than for traveling round the country. Excepting the Darracq-Serpollet sleeping car, and the monstrous saloon car by the same firm, all the bodies are fit for mounting on reasonable chassis and performing the work expected of them. There is a tendency to keep down weight and at the same time to provide protection for passengers and drivers against wind and rain. Fixed extended tops are less frequently seen. Quite a number of limousine and landaulet bodies provide protection for the driver by a very neat folding leather hood with considerable downward curve. Glass screen, extended top and metal stays are all abolished when this hood is adopted.

One of the Rothschild Creations.

A berline de voyage by Rothschild, shown on the La Buire stand, is an example of this. In bad weather the driver is protected by a black leather, broadcloth-lined hood, low enough to keep out much wind and rain, yet not so low as to obstruct his view. When opened the hood is mounted on a bearing on forward edge of front seats. If it is not intended to be used for some time, it can be lifted off this bearing and placed on another at rear of front seats, the hood then folding up neatly against body. Ample provision is provided for luggage on this car. On the right footboard is a large wooden black leather-covered chest, specially shaped to fit round the side levers. On the opposite side is a smaller square box between front and rear entrances. The roof is surrounded by a gallery and carries three specially shaped water-tight trunks. Finally, on a luggage carrier at the rear are three superimposed trunks, shaped to fit the body. Gasoline pipe is brought out to one side so that tanks can be filled without disturbing trunks. Entrance to body is by side doors, opening back to front. Interior fittings are in polished wood with green broadcloth for seat, backs, and arm-rests only. There is one rear seat for two people, one-half capable of being drawn out to form a couch. The whole of space between lower part of front window and floor is occupied by a series of drawers each with lock and key. Above them is an extensible ledge forming table, on which is fitted a small pivoted mirror. The left and right corners above this table are fitted with semicircular cupboards, and near the roof is a



ALCYON, A VOITURETTE THAT ATTRACTED ATTENTION.



SHOCK ABSORBER OF THE METALLURGIQUE.

shelf with clock, barometer and thermometer. Without unnecessary weight the car has everything necessary for two people traveling extensively in a luxurious manner.

A Kellner Body.

A Kellner body on C. G. V. stand, painted in yellow and black with red lining, has inside steering, with glass windows letting down into pockets so that driver's seat can be completely isolated from rear compartment or the vehicle made open from front to rear. A small leather folding hood, similar to one just described on the La Buire car, protects the driver when the front window is let down.

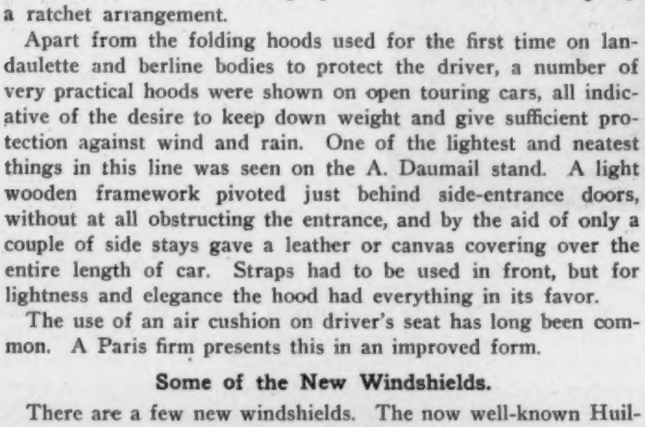
Belvalette has a remarkably good landaulette body on a Herald chassis. Semi-elliptic springs support the chassis in front and elliptic springs are employed in the rear. The closed body is entirely independent of front seats and is separately suspended on four straps passing round C springs in front and behind. Provision is made for taking up the stretch of these straps by a ratchet arrangement.

Apart from the folding hoods used for the first time on landaulette and berline bodies to protect the driver, a number of very practical hoods were shown on open touring cars, all indicative of the desire to keep down weight and give sufficient protection against wind and rain. One of the lightest and neatest things in this line was seen on the A. Daumail stand. A light wooden framework pivoted just behind side-entrance doors, without at all obstructing the entrance, and by the aid of only a couple of side stays gave a leather or canvas covering over the entire length of car. Straps had to be used in front, but for lightness and elegance the hood had everything in its favor.

The use of an air cushion on driver's seat has long been common. A Paris firm presents this in an improved form.

Some of the New Windshields.

There are a few new windshields. The now well-known Huillier swinging shield has been altered so that its height can be varied, the upper half now folding down on the lower half. The Chevalier is a windshield pivoted at the top and so arranged that it may be placed at any angle either forward or rearward, or if necessary fastened up against the extended top. When driving in wet weather the driver can place the screen at such an angle as to have some protection from the rain without having his view obstructed by the wet glass.



SHOCK ABSORBER OF THE WESTINGHOUSE.

Mirrors on Many Closed Bodies.

Mirrors for showing what is coming along the road behind are fitted on a large number of closed bodies and are likely to be very largely adopted within a short time. For town work the appliance is particularly useful, a glance at the glass telling the driver whether the road is clear in the rear or not, and thus being likely to avoid many an accident. It is a very simple appliance, the mirror being placed at a variable angle in a brass or electro-plated frame and fastened by means of a sleeve or a couple of bolts to one of the hood stays. Some machines have them at the left side of the car only, to reveal the presence of another machine trying to pass, others have one on each side.

To Examine the Chassis.

Delaunay-Belleville, C. G. V., and Mors each expose on their stands an apparatus for lifting up a body so as to examine the organs of the chassis. The coachwork is hinged to the chassis at the rear, held down at each side by special locks, and has its front stays supporting the top easily detachable. Under the body

REAR VIEW OF THE NEAT FIAT CHASSIS.

is a jack by the aid of which the coachwork can be raised, a couple of telescope side rods placed under the body preventing it being turned over completely.

An apparatus for a quick change of body is also to be seen. The lower surface of the coachwork is fitted with four rollers running in grooves prepared on the upper surface of chassis. After detaching bolts and stays a single lever releases two catches and causes the body to move backwards on the rollers. Support is given in the rear by a couple of struts of variable length, which drop to the ground automatically as the body clears the chassis. To remove the body entirely it is only necessary to place a couple of trestles under it, and after driving backward as far as possible with the lever, pull the chassis away.

ACCESSORIES PLANT FOR LANSING, MICH.

LANSING, MICH., Dec. 24.—Secretary Chilson, of the Lansing Business Men's Association, announces the addition of one more factory to the list of recent industrial acquisitions to the city. The Hayes Manufacturing Company, of Detroit, is to locate here and operate a plant for the making of automobile and carriage auxiliaries. The company formerly operated a small enameling plant in this city, but later concentrated its energies at Detroit. Besides the enameling and other work in metals, the company will also do leather work. The company has secured temporary quarters in the former Olds gasoline engine plant on River street.

ALONG FRENCH ROADS

By FRANCIS MILTOUN

THIS is a brief résumé of some of the things that matter for the stranger automobilist in "la belle France," the real land of good roads, good cooks, and good living—three things that matter very greatly to the touring automobilist.

The "good roads movement" in America has a future for itself that is in the class of probabilities; but in France it is already an achievement—begun by the Romans, continued by Louis XIV, Henri IV, and Colbert, and set well on towards perfection by Napoleon, who, as a road-builder, was as great a man as he was in many other respects.

History is not as dry reading as many hurried travelers suppose, and when we read it on the spot, by means of the kilometer stones which marked certain highroads leading out from the capital, we thought it most enjoyable. We had been touring up and down France for many months—*"pour les affaires,"* though it was an agreeable business in spite of the fact that it *was* business—and arriving back at Paris in the early days of one of the loveliest autumns France has known since the beginning of automobilism, we mapped out a series of radiating tours, over well-known ground in some cases, and in others quite new.

First we followed the flight of Louis XVI, from Paris to Varennes; then the road to the north, the old posting road to Calais over which century-old travelers made their ways—in part of the ground hallowed by Sterne in his sentimental wanderings, and the same over which de Warde and Buckingham traveled from Paris in Dumas' romance of "The Queen's Necklace." Then there was the itinerary of the lower Seine, along which a steady stream of travel made its way from the old Norman capital to Paris under the old régime. The Orleans road down into Touraine and the chateaux-country, where, at Beaugency on the Loire, we got on the trail of Dumas' hero *D'Artagnan*, gave another pleasurable itinerary. Finally we rolled off the paved kilometers between Paris and Villeneuve-St.-Georges in rounding up the little Fontainebleu artist's villages of Moret, Barbizon and Montiguy, not forgetting the forest and the palace themselves.

Here was history writ large all along these magnificent boulevard roadways, conceived of a generation which knew not automobiles or suspected their advent. Even if we had forgotten the facts of history which led up to the magnificent roads of France of to-day—which we hadn't—these itineraries, taken all in all, cover almost every variety of roadway in France—all except mountain-climbing by automobile, in the Alps and the Pyrenees. That deserves a chapter to itself, and perhaps some day it shall have it. I have the writing of it in mind.

Road Building Is an Old Story in France.

Road building in France has been well thought out since the Romans crossed the Alps via the ancient Voie Auguste, which passed over the Col of the Little St. Bernard and bound Gaul with Italy. To-day this is actually "Route Nationale" No. 90.

At Lyons, in the Rhone valley, which across-France automobilists have cause to remember, if only for its Hotel de l'Univers et Automobilisme, which has abolished the *pour-boire*, the Romans built four great spoke-like roadways; one leading towards Bordeaux through Auvergne; one to the Meuse and Rhine; one to Genosiacum, the Boulougne-sur-Mer of to-day; and the other southward to Aix-en-Provence and Marseilles, there to join up with the Voie Aurelian into southern Gaul.

On this latter route are three existing reminders of the Roman road builders which all automobile tourists to the south of France should look up in passing. One is an ancient Roman milestone, or whatever corresponded in that day, in the Hotel de Ville at Salon, directly on the route between Arles and Aix-en-Provence; another is the evidences of a Roman wall flanking the roadway just east of Aix, near St. Maxibin, marking definitely the Voie Aurelian through Provence; and finally there is the Augustan "Trophy" at La Turbie, back of Monte Carlo, a monument which may well be counted a prodigious milestone of civilization since it marks the victory of a score of the savage races of Gaul.

To follow up and down the roads of France, and to rebuild history from the remains visible to-day of the work of ancestral road-builders is one of

The Most Enjoyable Occupations Imaginable

but it requires a well-thought-out itinerary, with due regard for the lay of the land, or one will miss much en route.

These four great highways centering at Lyons were the first great highroads of France, and they languished, like many other innovations, for a time. In later centuries, with the coming increase of travel and finally travel by carriage (an importation into France from Italy, by the way) crossroads and still other main roads were built, until, in the days of Henri IV., when he was still king of Navarre, some evil genius invented a pavement of cobblestones, and the otherwise gallant Henri laid down leagues and leagues of it, that he might travel the more comfortably (?) from his ancestral chateau at Pau to his French capital.

To-day there are nearly a hundred kilometers, straightaway,

of this execrable *pavé* still left south of Bordeaux, which the automobilist en route for Biarritz or the Pyrenees may only avoid by making a very considerable detour. Its tire and machinery-racking proclivities are such that it is by far the better part of valor to leave the main road, south of Bordeaux, at Bazas, and make the detour via Castlejaloux.

The most traveled automobile road in France, without doubt, is that from Paris across Normandy to Trouville, the same with its branches which lead either to Rouen, Le Havre or Cherbourg. It leaves Paris via the route colloquially known as the "Route de Quarante sous," via Mantes, Vernon and the dreaded Côte de Gaillon. If not actually the most traveled by automobiles for its whole length, it certainly is so in parts, and the road surface is literally ground up into a powder. The fine particles which have been broken up from the surface by horses' hoofs, carts and wagons are sucked up by the action of pneumatic tires and strewn about the surface like the ripples of sand that one sees on the seashore. There is no denying that the

AUGUSTAN TROPHY AT LA TURBIE.

Automobile Traffic Does Work This Damage,

but only after the "sharps" of horses' hoofs and narrow iron tires of other classes of wheeled traffic have done the ruin in the first instance. It is all a question of speed, however; the same question which affects the life of pneumatic tires themselves. At twenty miles an hour pneumatics are a very satisfactory article as to their wearing qualities—this in spite of their perishable material—but at sixty miles an hour they wear very rapidly, even leaving aside the question of the total distance run.

The French road authorities have proven beyond question that the damage done roads as now built, by fast rolling mechanical tractors, depends entirely upon the question of speed and the frequency of the traffic. Some method of adapting existing roads to the new traffic will come some day, and it is not futile to prophecy that France will be in the lead.

In the Departément of the Charente, where the "Routes Nationales," the "Ronks Deportémentales," and the "Chemins de Grande Communication" are particularly excellent and excellently well kept, it has been demonstrated and proven, so far as figures can prove, that a load of 9,000 kilos drawn at a rate of four kilometers an hour, does no more damage than a weight of 600 kilos at fifteen kilometers an hour. It is an astonishing comparison to the uninitiated, but since it is well attested by the authorities, it must perforce be accepted as a possible condition applicable everywhere.

The demonstration was an entirely practical one, in spite of the difference in weights and speeds, but all conditions have to be met, and the fast-running, high-powered racing machine has an effect upon road surfaces that will not be denied by any one who has viewed a "course" after a race has been run.

The roads of any land were made for road users, whether they travel by one means of locomotion or another, hence new conditions, if they require it, must have justice meeted out, regardless of the fact that a few

Years Ago These Conditions Were Unknown.

It is safely to be asserted that the automobilist's interests—in France, at any rate—will not be lost sight of, and since automobiles pay the French government a tax, and a heavy one (based upon horsepower), the authorities will certainly see to it that this class of road users get something for their money. There may be graft in France, but not of the kind that takes the benefits of publicly paid taxes for personal gain.

The early road traffic in France, directly after the Roman roads were built, and, indeed, well along into the reign of Henri IV, was only by means of the now disappearing horse—literally on horseback. Sometimes travelers rode in a sort of horse-borne litter, but more often on the back of that one-time utile animal, the horse. The *carrosse* came with Louis XV, a sort of gaudy circus wagon, lumbering and luxurious (something like what London's Lord Mayor rides in to-day), and by this time the roads improvement movement had got a very considerable impetus. Down through Napoleon's time and the Restoration came and passed the *"berline de poste,"* the *"chaise de poste,"* and the *"coupe de poste,"* and finally the *"malle-poste"* and the *"diligence,"* until to-day France has the most highly organized, the most efficient, and the most extensive system of public service automobiles extant.

As an enterprise, this form of locomotion is gaining ground everywhere in Europe; in Germany, where

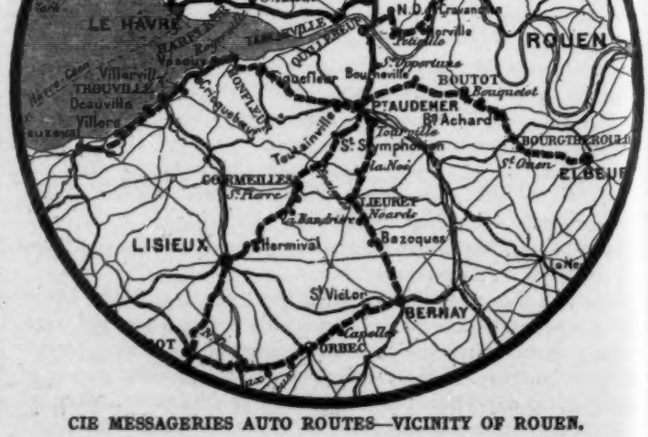
The Berlin Taximeter-Cabs

are more numerous and efficient than elsewhere, and in England, where the South Western Railway is using the automobile omnibus as a feeder, in thinly populated parts, to its main line service.

In France the various "Syndicates d' Initiatives" are running services of great touring-automobile-omnibuses to certain popular tourist points in their respective localities. One of the most popular and successful of these is that which runs out from Marseilles to Mont Victoire, Ste. Baume, and the Etang de Berre, and in the Puy de Dome region there is an elaborately installed service at Clermont-Ferrand. At Chambéry and Grenoble, and in the Vosges, there are yet others, but all of these enterprises are put far in the shade by that of the Cie des Messageries Automobiles of Rouen in Normandy.

One hundred and fifty kilometers of route are covered, one, two, or three times a day, by this enterprising company, transporting passengers and package merchandise at astonishingly low rates. This service will be extended next year to include over five hundred kilometers. What a great service and accommodation it renders, even to a region seemingly well covered by the *cheminde-fer,* is readily seen by a glance at the map herewith. The services are made principally with an omnibus of 40 horsepower, carrying eighteen or twenty persons, and luggage and package freight. The speed averages twenty-five kilometers an hour, which is about as good going as is advertised by the railway in France on cross-country lines.

Another enterprise has just been given to the world between Draguinan and Castellane, in the Basses-Alps—that wonderful background to the Riviera of France, which conventional tourists



CIE MESSAGERIES AUTO ROUTES—VICINITY OF ROUEN.

MET ON THE ROAD IN FRANCE.

PASAGE À NIVEAU.

TRÈS BELLES VACHES.

LE TROUPEAUX.

know so little. The *diligence* has all but disappeared in France, but here it has been running regularly once a day between these two points, and even further—to St. Andre-des-Alpes. The *diligence* covered the distance in either direction once each day, a distance of eighty kilometers, in ten hours. The new service made by La Buire omnibus—on mountain roads, mark you—does the eighty kilometer journey (over fifty miles) in four hours, a sixty per cent. gain.

Incidentally there are some lovely bits of unexplored roadway here (at least unexplored by strangers), just inland from the Mediterranean coastline, which are worth looking up.

It is a far cry from the incipient "Routes Royales" of the time of Louis XIV to the perfection of the "Routes Nationales" of to-day, or at least to their approach thereto. Even with France the praise of good roads may be qualified; M. Georges Prades complains bitterly almost daily in his journal *Les Sports* that the roads in the immediate vicinity of Paris are a disgrace to the nation, and with some truth this is so; all the way to St. Germain they are awful, and to Pontoise, and out on the Route d'Orleans, but great trunk lines and encircling automobile boulevards will come in time and do away with all this. Once away from Paris there is no need to qualify any eulogistic remarks one may be disposed to make.

Napoleon's Share in the Development

of the roads of France was something more than an amateur's piece of work. He leveled off hilltops, filled up gullies, and straightened many curves—all of this work which is continued from day to day by the present authorities. Napoleon's principal idea was a militant one, and a good one, viz., that a gun carriage should be able to gallop over main roads (hills and all) at a speed of twenty-five kilometers an hour, over secondary roads at fifteen kilometers an hour, and over third class roads at ten kilometers an hour. It is seemingly for this reason that the main roads of France, though sometimes the longest route between two given points, are often the "fastest," as the term is understood by automobilists.

There are six distinct classes of roads in France, known officially as follows: "Routes Nationales," built and kept up at the expense of the national government; "Routes Départmentales," built and maintained by the various départements, but at government expense; "Chemins de Grande Communication," usually connecting two important communities simply, who maintain these local roads aided by a government grant; "Chemins de Moyenne Communication," of less importance than class three, maintained by the local communities, but under départemental control; "Chemins de Petite Communication," still less important, maintained locally, but still under governmental control; then comes the least important class of all, "Chemins Ruraux," built and maintained wholly by local concern, without any form of governmental control beyond inspection. Any and

All of These Are Automobile Roads

though naturally the inferior classes are frequently bad in spots. That describes them well, bad in spots, nothing more, and that is why automobiling in France is as pleasurable as it is; the question of bad roads is almost entirely eliminated.

The "Routes Nationales" average only a 3 per cent. grade, the "Routes Départementales" 4 per cent., and the "Chemins de Grande Communication" 5 per cent. Of course in spite of this one strikes a stiff bit of road now and then, even on the "Routes Nationales." At Gaillon, in Normandy, the *venue* of the classic hill climb, there is a straight kilometer averaging one in ten, and you don't have to measure this to find it out; the government steps in again and puts up a notice board and informs you that the grade of this *câte* is 10 per cent. for 1,100 meters, and that if you are so unfortunate as to be traveling by a horse-drawn vehicle and get stuck on the hill that you will find a tow-horse nearby. This *is* paternalism. Madame de Sévigné would be glad to have had such when she got stalled the same way in 1698, though she did write to her daughter that she was traveling through "the most lovely country in the world."

The hills on the "Routes Nationales" are invariably well graded, and the roadway itself is wide, well shaded by trees planted along the borders, and invariably well kept. On the main roads, too, the decree has recently gone forth from the powers that be that no road repairs shall be undertaken on more than half of the width of the road at one time, that no unrolled stone shall be left indiscriminately spread over the road, and that a free, unobstructed passage shall be given to automobile (and other) traffic at all times, and over as wide a portion of the surface as may be practicable.

How French Roads Are Built.

The paternalism of the French government is a wonderfully painstaking and efficient thing, and it is looking after the automobile industry in the same way, differing only in degree, that it is over the "Beaux Arts" and "la langue Française." The actual making of the roads in France has long been an art; it probably always has been, else how would they be so near perfection to-day. The granite block *pavé*, which has not wholly disappeared, is an abomination, of course, but it is mostly in the towns that it is met with, so that's a minor consideration for the tourist. The *pavé* in France is by no means as bad as the same thing in Belgium—the worst in the world, and there more frequently met with—and doubtless this form of road building served its purpose when laid down, when its chief object was to guard against hub-deep mud in certain places. It is largely disappear-

ing, however, so its very existence is more of a fancied bugbear than a real one.

Many of the chief roads—most of them, it almost seems, glancing one's memory backwards—are beautifully cambered, with a draining gutter at either side and a row of graceful poplars, tilleuils or plantanes as a border of green, giving at once a wind break and a sun shelter. The surface is very porous, and rain sinks in immediately or runs down towards the edges, leaving the crown of the road, if not exactly dry, at least not muddy to anything like the extent that they are in England, where they pride themselves on the road surfaces, though it is thus shown they are really far behind France. This tree planting along the borders is one of the reasons why French roads are so enjoyable to roll over in a smoothly-running automobile.

It was an innovation brought about by a royal decree in the times of Louis XIV, and any one who should damage or uproot these trees was condemned summarily to be hung from the nearest. This was before the days of the guillotine in France, and before the days of scorching automobilists who have, on more than one occasion since, cut down a tree beside the road and killed themselves and irretrievably damaged their automobile in the process. One does not forget the most tragic event of this nature which has occurred in France—he was an American, too.

One real grievance the automobilist has against the roads of France, and that is that they cross the railways mostly at a level. This is dangerous in the first place, and exceedingly inconvenient in many other instances. Many and many a time have I waited a full fifteen minutes to allow some little jerk-water railway train to pass just because the

Woman Attendant Would Not Open the Gates

and let us by. Her rules are very strict. She must close the gates at a certain prescribed time before the train is due—if it is late five, ten, or fifteen minutes it is all the same—and she must stand beside it, flag and horn in full view of the engineer of the passing train. She dare not open the gate for you, even though she may have a clear view for five miles down the line; she would lose her job if she did—and were discovered. This is good organization, and it would be a crime to tempt fate or attempt to bribe the honest soul in charge of the gates. My advice is, suffer it and take the other blessings of the automobilist in France as making up for this inconvenience. All the same here is a chance for an improvement. Some amelioration of this state of affairs has been made here and there, mostly near the large towns, by carrying the trains above the road level on a viaduct, but in general, level crossings are the rule.

Too Frequent Tarring of the Roads.

Another little worry has been the frequent tarring of the road surface here and there by enterprising local authorities, in order to preserve the surface and keep down the mud in the rainy season. It has been efficacious in both these respects, but more than one automobilist in going over a piece of newly tarred road has got globs of it all over his face and clothes, and, like some other gluey things, it won't come off without a lot of hard work. Moreover, it sticks to the automobile body work and mud guards, and forms often a real blemish which the ordinary cleaning up has not the slightest effect upon. How great an annoyance this really is may be judged from the fact that Consul-General Mason at Paris thought it great enough to make mention of in his consular report to Washington, presumably as a hint to the road authorities at home that they might make any such process a "quick-drying" solution. I do not know whether France was the first to apply this process—which is a very good thing when it has dried out—but the Département des Ponts et Chausées put the thing in operation on a piece of Algerian roads between Oran and Mes-el-Kebir long, long ago. It works well everywhere, except on hills, where it forms too slippery a surface for horse-drawn traffic.

One other detail of French road building the automobilist does not like are the frequent *canivaux* or culverts crossing the roads near the towns. These culverts have a function of their own to perform, but they also cut down the automobilist's speed very effectually—which is sometimes a good thing, even though an automobilist says it. It's very disconcerting and often disastrous to strike a foot deep sharp-angled culvert *en pleine vitesse,* and no one with a care for his automobile will do it. As like as not he runs into a twisty, turny little narrow-streeted town immediately, and the intimation of a *canivau* may save him from something even more disastrous. At night the danger is trebled, and a six-inch deep *canivau* is a terrible thing to strike at anything over six miles an hour. *"Quel malheur! ces canivaux encore!"* said a fat Frenchman to me one night in a garage at Dreux when he was working the whole night through replacing the two front springs of a big touring car.

Animals That Cross the Road a Worriment.

Sheep are an ever-present worry and danger on the roads of France, as they are in most European countries. Being foolish beasts—utterly so—they know not which way to go, and bring your automobile to a standstill unless you are specially bloodthirsty. Unless you are of that category, and have no appreciation of the efforts of the guardian to get his charges out of the way, and the even more intelligent efforts of that specious variety of dog known as a "sheep dog," you will wait their pleasure, even though it galls you.

Dogs, running all over the road, particularly near the towns, are a real danger, to themselves and you, and hens and geese are as idiotic as the sheep, perhaps more so. The artist who first designed a poster, advertising the automobile, with a flock of geese crossing its path in all directions, certainly knew what he was about.

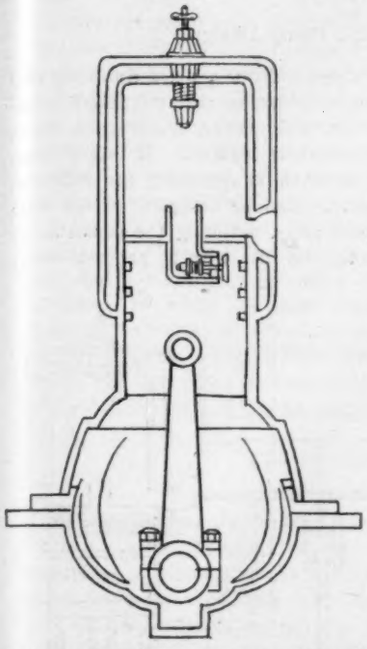
There is one rule of the road in France which does not seem to be known by foreign automobilists—and not by all Frenchmen—and that is, that on seeing another vehicle approaching on a cross road on your right, you must stop and give it the right of way. If it is coming on a cross road on the left you have the road, and it is your right to pass. It is a simple rule, easy to remember, not complicated, and a most excellent one.

(To be concluded next issue.)

DEVELOPMENT OF THE TWO-CYCLE ENGINE—PART II*

By C. P. MALCOLM.

THE first departure from the ordinary construction which we will notice is that of admitting the charge from the crank chamber into the cylinder through a valve in the center of the piston head. This valve must be opened by the charge lightly compressed in the crank chamber, and, as at the time of admission, the motion of the piston carrying the valve is being quickly retarded by the piston approaching its down center, the charge has to lift the valve against its weight and momentum moving in the opposite direction from the entering charge. With the engine running at any speed the valve will not lift, so the only practical way of using this device is to place the valve in a horizontal position, directly under the piston head, with its open passage curved at a right angle and screwed through the center of the piston head.



CRANKCASE COMPRESSION WITH INLET THROUGH PISTON.

This part, in the shape of a tube, should project through the piston as far as possible without striking the cylinder head when the piston is on its up center; and when at this point the spark plug should project downward into this tube. It is better to have the spark plug long enough so that the spark will occur near the bottom of this tube; then when the engine is running light and throttled down to a slow speed, no matter how small a charge may enter the cylinder, the mixture that is in this tube is pure and can be easily ignited every time; that is, if the spark plug is so near the bottom of the tube that when the tubeful is the only charge that goes into the cylinder when compression takes place, the pure charge is not pressed down into the tube by the compression beyond the spark. This arrangement makes this engine very flexible, and it will run light at a very slow speed without missing explosions, the ignition being very positive at all times. The exhaust port extends around the entire circumference of the cylinder and does not require to be one-half as wide to have greater capacity than the ordinary. Consequently that much more of the power stroke is utilized, besides which this tube accomplishes the work of a deflector much better than those in ordinary use, if not as well as that described in part one of these papers. The charge cannot enter the cylinder until the pressure in the cylinder is less than that of the crank chamber, and cannot be ignited because of its entering the cylinder too soon; altogether it is an excellent construction, the only objection to it being the necessity of a check valve.

Relative Merits of Different Types.

To a great many designers the use of the crank chamber as a compression space appears to be objectionable. It should be air tight, and as a two-cycle engine will not run very nicely after the journals are worn so as to be quite loose, the crank journals will have to have stuffing boxes, or some equivalent, in order to insure their being air tight. As the remainder of part two of these papers will be devoted to the consideration of different types of gas engines that do not use the crank chamber for compression space, this may be a good time to recall some of the fundamental principles underlying all gas engine practice, that it may help us in estimating the relative values of each type of engine under consideration. None of the power that is expended in compressing or for suction is lost, except the loss from leakage and what is consumed in transferring the air or gases from one place to another, as the force of the compression or suction is expended again in moving the piston in the opposite direction after it has passed its center. For instance, in the compression of the charge in the power cylinder, and in less degree, the suction from throttling the intake; but when the compression or suction expends itself without such action on a moving piston, as in compressing the charge of a two-cycle motor in the crank chamber, or some equivalent, all the power consumed in such compression or suction is a dead loss, and whatever compression is used in excess of that required to transfer the gases from one place to the other, in the time allowed for such transfer, is a waste of energy. On the other hand, for a given cubic displacement of piston the pressure depends entirely upon the cubic capacity of the compression space, and the velocity of the entering charge depends upon the degree of its compression. If the compression is, say four pounds to the square inch, it will go in four times as fast as it will after the pressure is down to one pound, and so on down until we measure it by a few ounces of pressure and the motion of the gases becomes very slow before being cut short by the piston beginning its up stroke and again producing a vacuum in the crank chamber. With any form of construction there will be, when the engine is running at high speed, a few ounces of compression left in the crank chamber when the piston begins its up stroke, and the amount of charge that should have gone into the cylinder, but did not, represented by these few ounces of pressure, depends upon the cubic capacity of the compression space. If that is, say, four cubic feet, there will be four times as much charge left in the crank chamber that should have gone into the cylinder as there would be with only one cubic foot of compression space.

Taking all these factors into consideration, we can see that there is an economy limit in both directions as to high and low compression in the crank chamber; and in this one particular the ideal two-cycle engine would be one that had no compression space at all, but was fed by a pump that began its supply stroke as the cylinder inlet port commenced to open and completed it as the inlet port closed. There would then be no compression except that required to transfer the charge from the pump into the cylinder, a few ounces at most, and there would be practically no charge excluded that should have gone into the cylinder. This action would be uniform and positive at all speeds, whether the engine was running 2,000 r. p. m. or only 50 r. p. m., except that the transfer pressure would be greater at high speed.

Importance of Large Passages.

We also see the economy of having all of the ports, valves and air passages of all gas engines of ample capacity; it will take twice the compression to transfer the air into the cylinder through ports or valves of one square inch of area as it would through ports or valves of two square inches of area in the same space of time; or to invert it, with a given crank-chamber compression, the highest efficient speed of an engine with two

*Part I. of Mr. Malcolm's treatise was published in "The Automobile," October 25 and November 1.

square inches of area will be twice that of an engine with ports of only one square inch area. This is circumferential area; the area gained by widening the ports is not of the same value, because the motion of the piston is slower as it approaches the center. Some designers think that the compression in the crank chamber is not sufficient to move the gases fast enough for high-speed engines, and we have several designs in which the pump end of the cylinder is closed and a piston rod passing out through a stuffing box the same as a steam engine is employed. The space between the piston and the pump end of the cylinder, together with the air passage to the inlet port of the cylinder, can be made of such size as to give any compression desired. Where this construction is adopted it is better to depart entirely from the usual gas engine practice and build on steam engine lines, using a cross head and slides. In designing the compression space for engines of this class it must be borne in mind that all of the power used to obtain this compression is a complete loss, and judgment should be used as to the amount of compression necessary to obtain the desired results. There is another feature of using high compression in the crank chamber, or its equivalent, of the two-cycle motor that has not been referred to, and is seldom given the consideration its importance deserves, and that is that the greater part of the charge goes into the cylinder before the port is anywhere near wide open. This is especially the case when the engine is running slowly. When the inlet port first begins to open there is an infinitely thin jet of charge nearly half way around the cylinder, shooting into it, and if the deflector works right it is sent up close to the walls of the cylinder. If the greater part of the charge goes into the cylinder while the port and the deflector are in this position this thin jet of charge will be deflected up and across the cylinder head and down to the exhaust port in a thin sheaf, leaving quite a core of undisturbed exhaust gases in the center. Any method that will make the flow of the charge into the cylinder nearer uniform, but somewhat greater at the beginning, will give more practical results.

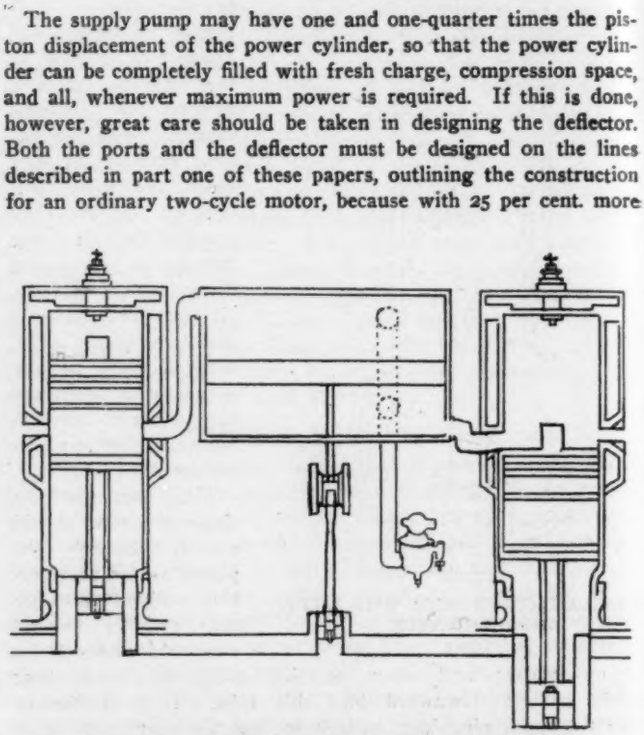
The External Compression Type.

An important type of two-cycle engine is that which has an independent air pump or supply cylinder. These are seldom, if ever, used except with two or more power cylinders; the pump is double acting, so that it can supply two power cylinders of a capacity equal to its own. Such a pump can be placed between the power cylinders and operated by a separate crank on the crankshaft. The pump should be timed with reference to the power cylinder so that it completes its supply stroke at the same time that the inlet port of the cylinder that it is supplying closes its inlet port. The inlet port of a two-cycle motor is open for considerable more than one-quarter of a revolution, and as the supply pump stroke is one-half of a revolution, and at the beginning of its stroke it has the entire cubic capacity of the piston stroke, as well as that of the passage from it to the intake port of the power cylinder, there will be considerable compression space, even if the conducting passage is not made much larger than is necessary to have ample capacity to conduct the charge. If made in this way the pressure may run up to five or six pounds by the time the inlet port opens, after which it will drop to the few ounces necessary to transfer the charge from the pump to the power cylinder. But the transfer is positive at any speed of the engine.

The ideal working of an engine of this type can only be attained by having three power cylinders, with the supply pump running one and one-half times as fast as the engine, that is, making three strokes while the power pistons are making two, or one revolution of the crankshaft. The timing must be the same, so that the inlet port of the cylinder that it is supplying at this stroke closes at the completion of the pump stroke. Then the port will begin to open almost at the beginning of the pump stroke, the difference being only about one-twelfth of a revolution, and as the pump piston is passing its center at this time it will have moved only sufficient to produce a few ounces of pressure before the inlet port opens. The operation is simply a transfer from the pnmp to the cylinder, and it is accomplished without any compression above that necessary to effect it. All of the cylinder inlet ports may be connected by one passage to both ends of the supply pump and the pump timed with the power cylinders so that any one of the ports will close at the completion of any stroke of the supply pump piston. Just after the beginning of any stroke of the supply piston a cylinder port will begin to open to receive the charge. The charge enters the cylinder at a uniform speed, the port being wide open when the supply piston is at its highest speed and it begins to close as the piston slackens its speed as it approaches its center.

Compression Pump Design.

The supply pump may have one and one-quarter times the piston displacement of the power cylinder, so that the power cylinder can be completely filled with fresh charge, compression space, and all, whenever maximum power is required. If this is done, however, great care should be taken in designing the deflector. Both the ports and the deflector must be designed on the lines described in part one of these papers, outlining the construction for an ordinary two-cycle motor, because with 25 per cent. more



EXTERNAL COMPRESSION TYPE WITH TIMED PUMP.

charge actually going into the cylinder than its piston displacement it is important that all of the exhaust be expelled before any of the charge can be forced out. When the supply pump is given a higher speed than that of the engine it should be of greater diameter and shorter stroke, so that its piston velocity may not exceed that of the engine piston. In this way, although the supply pump makes three revolutions while the engine is making only two, it will actually be running no faster, and the stresses on its connections and journals will be no greater. There is very little stress upon the supply pump, as it only works against a pressure of two or three pounds at the most, and it may be made of sufficient diameter so that its crank may be only one-half of that of the power piston, or even less, to furnish the full amount of charge required.

A good form of construction for an engine of this kind consists of placing the supply pump horizontally across the power cylinders, close to the inlet ports. The drive may be a bevel or spiral gear with a short shaft at right angles with the crankshaft. If a bevel gear be used this shaft should not be horizontal, but incline upward so as to bring the center of the supply cylinder high enough from the base to set in close to the cylinders above the sweep of the cranks. With a spiral gear it will not require a very large pinion to bring the supply crank high enough to keep the shaft level when the supply cylinder is properly placed. The valves for this supply cylinder can be made of the sliding type, like those of a steam engine, and run by an eccentric from

the supply pump shaft. With the pump strokes as short as that described there will be ample room for the pump and its connections in the space of the width of the three cylinders. To regulate the speed of this engine a throttle can be placed between the inlet ports of the power cylinder and the pump with a spring safety valve between the throttle and the pump, set to relieve whatever the pressure exceeds, say, two pounds to the square inch. This should empty back into the conductor passage between the carbureter and the supply pump, so that when the throttle to the cylinder intake port is closed the supply piston pumps the same air over and over again through the spring safety valve.

There are some quite successful engines of this type in operation that pump the charge into a reservoir; that is, the conductor passage, from the pump to the cylinders, has capacity sufficient to hold two or three charges for a power cylinder, and no attention is paid to having the pump timed to correspond with the opening of the cylinder ports, three cylinders being supplied from a single air pump of larger capacity, running at the same speed as the power-cylinder pistons. The pump can be one of the cylinders on the crankshaft, making four in all, but the high-speed supply pump is the ideal of this type in every respect, except that it cannot be run with a crank on the engine crankshaft. However, by using the short stroke and large diameter supply cylinder, and placing it horizontally across the inlet side of the power cylinders, we get a very compact and powerful engine, at much less cost than a four-cycle of the same power, besides being about one-half of the weight and occupying one-half the space.

(*To be continued.*)

A German manufacturer, Julius Pintsch, of Berlin, has made a number of experiments in order to ascertain the comparative durability of various metals when exposed to the heated exhaust gases from internal combustion engines. The experiments indicate that bronze and copper are least adapted to endure exposure; nickel and brass are possessed of more enduring qualities, while machine steel, nickel steel, and cast iron show little depreciation from exposure. Cast iron stood the test far better when not finished, but even finished cast iron proved to be well suited for exposure of this character. The exhaust gases in the experiments referred to had a temperature of 700° F.—*Machinery.*

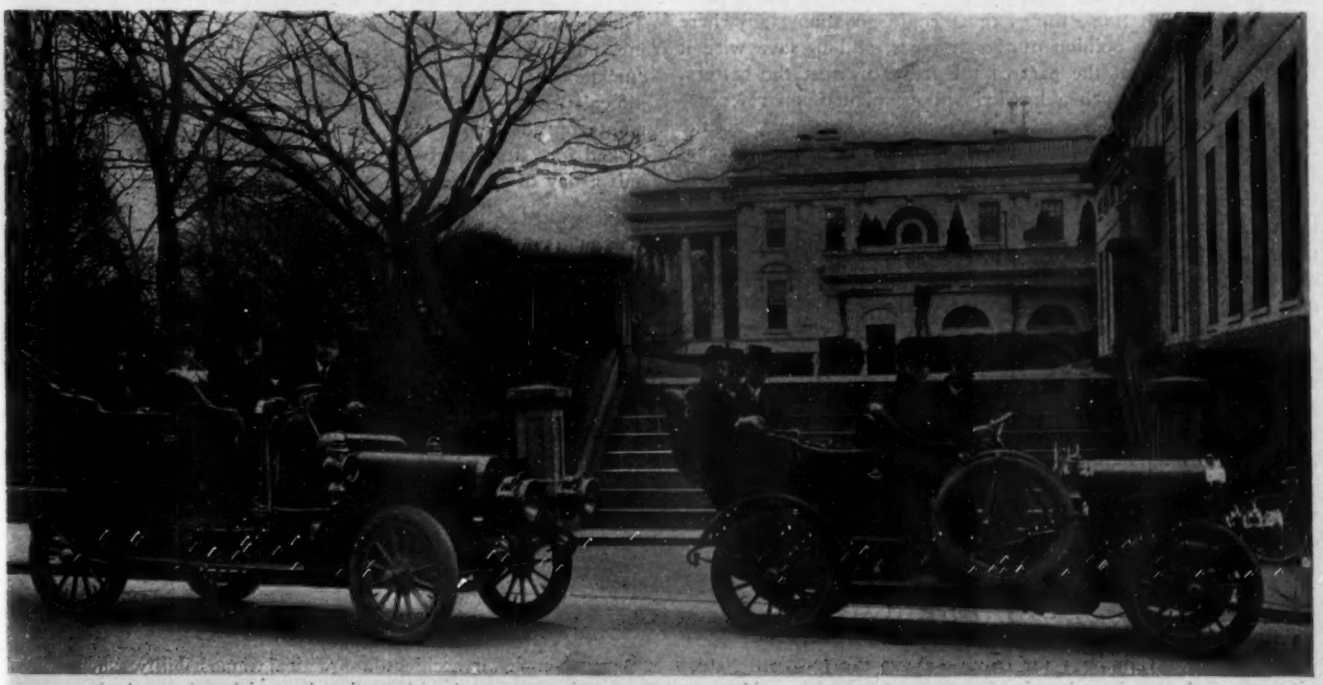
DRIVING ONE ANOTHER'S CARS.

Not the least diverting of the many incidents that marked the visit of the special committee of the Association of Licensed Automobile Manufacturers to Washington last week was the occasion afforded some of them to take a hand at driving the cars made by others. In the accompanying photograph of this auspicious event George N. Pierce is shown at the wheel of a Pope-Toledo touring car, with C. R. Mabley and Alexander Winton in the tonneau, while one of the Winton productions is shown placed at the tender mercies of Colonel George Pope. The cars were impressed into service on every occasion where it was necessary to get about and are shown by the accompanying photograph drawn up in front of the west entrance of the White House on the memorable trip to invite President Roosevelt to honor the Garden show in January with a visit. The fact that two of the leading members of the association are shown at the wheels of cars other than their own design makes a scene worthy of record. Having nothing else to do after the completion of the ceremony, they fell to "talking shop" while the camera artist was at work.

"A fine car," remarked Mr. Pierce, "but hang me if I like these pedals. Now, if Pope could only see the advantage of placing the clutch operating lever on the steering wheel——" About this time Colonel Pope was giving vent to somewhat similar sentiments. "Great thing, that Winton air-governing system, but, then, what's the use? This individual clutch arrangement bothers me, too, though I can't strip the transmission by bungling gears, and that's one good thing."

"Yes, a bonny car, this," Mr. Winton confided to Mr. Mabley, in the tonneau of the Pope-Toledo. "Easy running and plenty of speed, but not my style. Now, independent water jackets——" "Yes, what's the use," chimed in Mr. Mabley. "American cars are all right, but there are some things that are designed better on the other side. For instance, take the Simplex. There are so many things that can be——."

"Quite so, quite so," Mr. Franklin was telling Mr. Studebaker in the tonneau of the Winton just at this moment. "Gets over the ground in great shape and rides easy, too, but then, why have all that plumbing? Air-cooling, you know, with the auxiliary exhaust port——" "H'm, that's so, but give me water for mine every time." And just then the cars pulled away from the curb and were off down Pennsylvania avenue at a merry clip.



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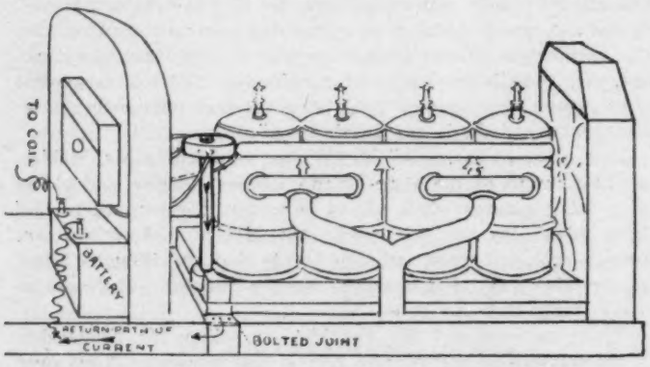
WHEN ONE AUTOMOFILE MAKER DRIVES THE AUTOMOBILE MADE BY ANOTHER MAKER.

REMEDIES FOR ROADSIDE PERPLEXITIES

By THE MAN AT THE WHEEL.

PROBABLY the very last thing to be suspected as the cause of ignition trouble is the manner of grounding the return circuit of the primary, or low-tension side of the system. It is one of those things to which the saying "Out of sight, out of mind" applies very forcibly, for, as a matter of fact, its influence for good or bad is seldom, if ever, taken into consideration. Though solidly made as a general rule, it is, like everything else about a car, subject to racking and vibration, and where it has seen several seasons' use may part unexpectedly. The result is a failure of the ignition that is apt to puzzle any but the most resourceful driver who uses his head rather than the brawn of his arm at the starting crank. It is a conundrum lacking in those puzzling features that are present when the engine will run spasmodically, stopping from no apparent cause, but it is equally exasperating, for, regardless of the hundred and one adjustments that may be made in the hope that they represent the source of the trouble, there is absolutely no result. The motor is as dead as utter lack of current for firing the charge can possibly make



SKETCH SHOWING NUMBER OF JOINTS IN PATH OF CURRENT

it, and nothing short of locating the break and remedying it will produce any action.

Just where this ground connection is most apt to be found will naturally depend on the make of car. Formerly it was considered to be one of those things that "could go almost anywhere on the car" in the opinion of the designer, and to save wire it was made usually at the part of the frame nearest the battery. The inefficiency of such a method will be plain upon reference to the accompanying sketch. The battery is shown at the dash to make it clear, the connection being made at the frame right beneath. Consequently, in order to complete the circuit, the current must travel down the vertical shaft of the timer, through its bevel gearing and the bearings of the latter to the upper half of the crankcase, from the latter through the joint or through the main bearing to the lower half of the crankcase and along its supporting arm, through the joint by which the latter is made fast to the frame. This means at least three or four different points where the low-tension current must find its way through metallic surfaces separated by oil or dirt, thus making poor electrical contact. Each one of these represents added resistance to the circuit and greatly impedes the flow of the current. More attention has been paid to the matter in recent years than formerly, ground cennections now being made somewhere on the motor with a view to presenting the least number of gaps of this kind. The ignition systems of old cars can be vastly improved by doing likewise.

A Long Hunt for an Unusual Trouble.

Six hours do not represent any great space of time, but when it is spent in a vain hunt for trouble about the ignition system of a car on the road, under circumstances that make rapid progress desirable, it is not exaggerating things overmuch to say that it seemed more like a week than half the span of daylight on a fall day. There were five of us, and everyone, from the driver down to the last passenger, considered himself something of a sharp in things automobile. Trouble, in short, was his long suit, but like the many cooks, the bevy of experts found themselves at a loss to produce anything tangible that would merit consideration. The perversity with which the motor would start on the first turn of the crank, only to give up the ghost again after a period varying from one minute to twenty, was little short of diabolical. The symptoms were indicative of a loose connection that was making intermittent contact, but the fact that it was invariably on deck when a start was in question negatived this supposition, and a painstaking search from one end of the ignition system to the other, in which every member of the party lent a hand, bore this out. Apparently there was absolutely nothing wrong with any part of it, though, as a matter of fact, each one of the searchers had overlooked the trouble half a dozen times in the course of his investigation.

Finally, after the motor had come to a step for something like the fiftieth time in the six hours, during the course of which less than ten miles had been covered, a systematic search was instituted. One man was stationed at the coils on the dashboard, a second at the timer, and a third at the crank, while the other two kept their eyes open for developments. As usual, the motor started on the first turn and ran smoothly for several minutes and then, also as usual, came to the inevitable stop.

"I have it!" cried the man at the timer, and suiting the action to the word, lifted the revolving contact out with his fingers, unaided. It was an old-style affair on which no great amount of skill had been lavished in its construction, as the revolving contact was merely held on its shaft by a single set screw dropping into a slight recess in the shaft itself. Vibration had caused the set screw to loosen to a degree where its point was all but free of this recess in the shaft. As a result the contact maker would turn at times and stick at others, the easy and certain starting being explained by the fact that when turning so slowly the shaft would invariably pick up the contact maker and hold on to it until the motor ran fast enough to shake it loose again. The timer had been inspected repeatedly while the motor was going, but naturally nothing amiss was to be seen under the circumstances. The grease with which the case was filled made it difficult to see whether the contact came to a stop on one of the points or not, which was the first thing that should have been looked for. Its discovery earlier in the search would have saved half a day of fussing.

An Emergency Rarely Duplicated.

Undoubtedly the most exasperating thing that can happen to a car is to have some one of the links of the transmission system fail while everything else on the car is in perfect order. Probably the rarest case of this kind that has come to light was where the telescopic joint of the propeller shaft pulled apart. The accident was partly due to faulty design in making the joint too short, and partly to the fact that there was too much play in the torsion and radius rods, allowing the axle too much lateral movement. Had it not been for the proximity of a blacksmith there would have been no alternative but to make a long tow home. As it was, the better part of a day was required to remove the rear axle and forward part of the shaft, straighten the latter where it had been dug into the road and replace things properly. The shaft was one of early design and another half inch of leeway on the end of the telescope joint would have averted the accident. Present day methods have made the recurrence of such an accident a practical impossibility, such joints now being designed with a liberal provision for end play.

PRODUCER GAS AS A FUEL SUBSTITUTE

COAL or coke as a substitute for gasoline, alcohol or similar liquid fuels would hardly appear to promise much for the commercial vehicle whether from the standpoint of economy or convenience. Experience with stationary plants of all sizes has conclusively demonstrated, however, that these two fuels when converted into a combustible gas and used in the internal combustion engine are far more economical than any liquid fuel, no matter how cheap, or than the same weight of fuel burned under

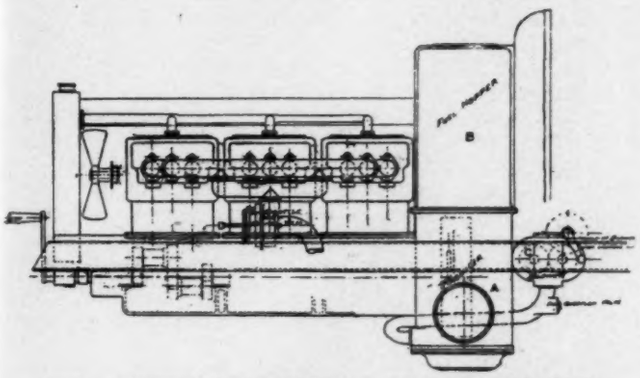


FIG. 1.—PRODUCER AS APPLIED TO A 6-CYLINDER ENGINE.

a boiler and converted into power through the medium of the most advanced type of steam engine, while the amount of attention required is not as great.

Hitherto the size and weight of the necessary apparatus for converting the solid fuel into a gaseous state has rendered its adaptation to the automobile out of the question, but there has just been brought to light an invention that is not unlikely to create a sensation in the industry, says the *Motor World* (Glasgow). This is a gas-producer which has been brought down to such small limits as to make the entire plant quite suitable for installation in an ordinary car, though perhaps it is in the commercial vehicle field that the new producer plant will find its proper sphere.

The modifications that have been found necessary to adapt such a plant to the necessarily confined space as well as the special arrangements required to render its operation easy will be plain from the following description, when taken in connection with the illustrations. Of course, none of the essentials such as the fuel hopper, air blower, water feed pump, gas cooler, washer, gas bag and water tank have been omitted. The plant is as complete as any used in even the largest stationary installations and the method of operation is the same. The producer is placed immediately forward of the dash and, as will be apparent from the illustrations, does not add greatly to the distance between the latter and the radiator (Fig. 1). In the elevation of the producer and the motor (Fig. 2), A is the producer itself, made from malleable iron, while B is a sheet-metal tank or hopper for holding the store of fuel, and as shown it is fitted with large openings for rapid refilling with coke or coal.

The producer is fitted with a special grate bottom, an ash-pan and cleaning cover, and above the grate on the side of the producer body a branch is fitted with a large lid for the purpose of clearing it and lighting the fire. The top of the producer is open to the fuel hopper, the fuel feeding from the latter automatically by gravity as fast as it is consumed. An outlet for the gas in the form of a vertical pipe passes up through the bottom, terminating close to the top, while an open end is provided surrounding which is a pendant tube of larger diameter, fixed to the top of the inner side of the hopper, this tube being perforated at its lower end.

The small centrifugal blower is driven by the engine through a sort of ratchet device which permits it to be rotated by a hand crank when the motor is stopped. A similar device is used on the crank as the latter is used for starting the producer; when the engine is running the handle is idle. Air is conveyed from the blower to the underside of the grate in this producer through light copper tubing, on which is fitted a spring-controlled relief valve. A small single-acting ram type of water pump maintains the necessary water supply for the gas. The cooler is composed of gilled tubes placed vertically to enable any grit or dirt to fall into a well or sump placed at the lowest point of the apparatus. As it is necessary to clean and purify producer gas before it can be used in an engine, a washer is always used. This is represented by F in the center of the drawing (Fig. 2). It is formed of a tube fitted with a screen and a set of baffle plates and is maintained partly full of water. The object of the latter is to compel the gas to pass through the water in order that the latter may relieve it of all the fine dust that it carries in suspension. From the washer it passes to the gas bag G, which is fed by pressure from the producer, through the cooler and washer to the control valve, this valve being operatel by the flexible covering of the gas bag. As the engine draws in a charge, the bag naturally contracts and as its cover is fitted to the control valve, the latter is opened, permitting the entrance of more gas from the producer. The throttle is operated in the usual manner, an auxiliary air valve being fitted to enable the operator to vary the strength of the mixture admitted to the cylinders in accordance with the demands on the motor.

Though from the description it would seem that such a plant must necessarily be cumbersome and weighty, such is not the case. The relative proportions of the plant and a six-cylinder motor of about 40-horsepower are shown in the first illustration, while the fact that a plant with sufficient capacity to serve such an engine with fuel can be made not to exceed 250 pounds, dispels this idea altogether.

Dunwoodie & Jackson, a Glasgow firm of consulting engineers, have the invention in hand and have made exhaustive tests to demonstrate the practical working of such a plant, as well as its cost of operation when compared with other fuels, such as gasoline and kerosene. Two producers were made, one of them small enough to feed a single-cylinder 3 1-2-horsepower, belt-driven car,

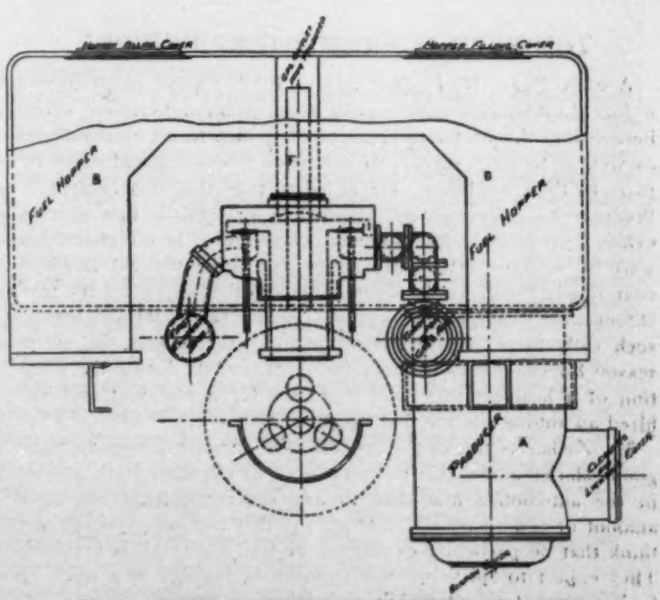


FIG. 2.—FRONT ELEVATION OF PRODUCER AND MOTOR.

which serves to show in what a limited compass the apparatus can be stowed, while the other was fitted to a car having a four-cylinder, 30-horsepower motor. Coke was used as a fuel and the tests showed that to run a 40-horsepower 'bus 19 1-8 pounds of fuel and two gallons of water were required per hour. Coke of the grade used for this purpose costs about .3 cent per pound

FIG. 3.—APPLICATION OF PRODUCER TO A DOUBLE-DECKED 'BUS.

placed on the car, making the cost of running per hour with an engine of this size approximately 6 cents, as compared with gasoline at 20 cents per gallon, or kerosene at 15 cents, the consumption of liquid fuel amounting to from two to four gallons per hour, resulting in an unusually favorable showing for the producer plant.

The motor can be started within five to ten minutes from all cold, the operation merely consisting of getting the fire under way and supplying air to the producer for a few minutes by means of the hand crank attachment to the blower. After this the car runs the same as one using liquid fuel. The driver has little if any more work to do than is the case where gasoline is used, as the mixture is fed and controlled automatically by the gas bag and valve referred to. The weight of the plant described which is suitable for an omnibus or other type of commercial vehicle using a 40-horsepower motor is estimated at in the neighborhood of 250 pounds, and, as the illustrations indicate, the space occupied is practically a negligible factor, nor does the addition of the plant tend to alter the appearance of the car materially. During the test of the car on which a producer plant was installed for experimental purposes, speeds ranging from 3 to 40 miles an hour were attained, the supply of gas being steady at all times as well as under good control.

THE NEED FOR COMPETENT DRIVERS.

ASBURY PARK, N. J., Dec. 24.—C. R. Zacharias, proprietor of a large automobile garage, will conduct an automobile school here during the winter to prepare young men to act as chauffeurs as well as to teach owners of cars how to operate and make repairs to their machines. He is led to take this step because of the scarcity of competent automobile drivers in this section, evinced particularly last summer when the calls for chauffeurs were so numerous that the automobile dealers could nowhere near supply the demand. Every time a dealer sold a car the purchaser would expect him to provide a man to run it; and besides such calls there were constant inquiries throughout the entire season for chauffeurs to serve for short periods during the vacation of a business man who was here for a fortnight and had hired an automobile for that length of time.

Mr. Zacharias thinks the opportunities for young men to make good salaries and obtain pleasant work as chauffeurs are greater in the automobile line than in any other requiring the same amount of experience. The trouble is that too many young men think that no particular experience or training at all is required. They expect to "pick up" the requisite knowledge in a week by fooling around an automobile aimlessly.

UNDERSTATING THE HORSEPOWER.

The practice of understating the power of engines is becoming so general in France that it is quite impossible in the majority of cases to attach any meaning to the usual system of rating. The leading firms have always adopted a composite figure which gives the normal and maximum powers developed; for instance, a 24-30-horsepower engine develops the lower power at its normal angular velocity, while the higher figure represents the maximum power obtainable. This is an intelligent and very useful system of rating, and if it were strictly adhered to comparison between the different types of engines would be greatly facilitated, says the *Autocar*. Of late, however, certain makers have been increasing the powers of their engines, without altering the official rating, in a way that is entirely misleading. The reason for this is a purely commercial one, and is intended to give the owner a higher opinion of the value of the car. So far as the limit of power is concerned, it is generally conceded that a 24-horsepower engine is all that is necessary on a touring vehicle. The public have come down from the high powers that were at one time in vogue. They consider that these big powers are unnecessary, that the increased consumption of fuel considerably augments the running cost, and what is of still greater importance the purchasing cost of the car increases so largely with the power that the average buyer is satisfied with a cheaper vehicle, which fulfills his purpose equally well. Nearly all the French makers, therefore, are giving attention particularly to cars propelled by engines rated at from 12 horsepower to 24 horsepower, but having confined themselves within these limits the commercial rivalry compels them to make the engines as powerful as possible.

Supposing an owner of a 24-horsepower car of one make finds himself passed on the road by a 24-horsepower of another make, he naturally concludes that the rival car is the better one, and when the time comes for giving out another order he may think of placing it with the rival firm. The other maker has therefore no alternative but to slightly increase the bore of his cylinders, whereby the car gets the reputation of being a vastly improved vehicle. Having started on this system of increasing powers, there is apparently no limit, and it is now a common thing for a car rated at 24 horsepower to develop 35 horsepower and even 40 horsepower. We know of one that will be taking part in the forthcoming speed tests in which the engine develops up to 60 horsepower. As the manufacture of an engine with a bigger bore entails little extra expense, the maker does not find it necessary to increase the price of his car, even if he were able to do so, and the only risk—and it is a sufficiently serious one—is the narrowing down of the margin of safety of the propelling mechanisms which were designed for the powers at which the cars are rated. On the whole, it cannot be said that the practice of giving a purely artificial value to rating is to be commended, and it would be better if the bore and stroke be stated.

ASCERTAINING POWER AT THE WHEEL RIMS.

The horsepower developed by an automobile motor and delivered at the end of the crankshaft, and the horsepower delivered at the peripheries of the road wheels, may be two very different things, and with this idea in mind the Autocar Company, of Ardmore, Pa., has installed in its factory an apparatus for ascertaining the power at the wheel rims. Two sets of friction wheels are belted to a dynamo, which, in turn, is wired up to a number of electric lights. The rear wheels of the car to be tested are placed on the friction wheels and the motor started; the current generated by the dynamo must be sufficient to keep the lights burning at the proper degree of intensity. If there is anything amiss between the motor and the rear wheels this test will show it in the inadequate current generated by the dynamo.

The Royal Automobile Club of Madrid, Spain, will hold an auto show in that city during May, 1907. French and Italian firms have already booked space. No duty will be charged on exhibits.

LETTERS INTERESTING AND INSTRUCTIVE

Reboring a Cylinder on an Engine Lathe.

Editor THE AUTOMOBILE:

[514.]—Under the head of "Letters Interesting and Instructive," please tell us how to rebore a 5 5-8 by 6-inch, single-cylinder, horizontal automobile motor in an engine lathe. Also how close to fit the new piston to the cylinder, and how to make the new piston rings in order to obtain good compression. Would cast steel or soft machinery steel do for the piston rings, or is cast iron the best? PUZZLED.

Canton, O.

As in directions for successfully putting salt on a rabbit's tail—first catch your rabbit—so it will be necessary first for you to find out whether the cylinder will stand boring or not before undertaking the work. This will depend on the original thickness of the cylinder walls and how badly they have been worn or scored. If the margin is very close it would be better not to attempt the job with your facilities. If, on the other hand, the amount of reboring required is not great, a new piston will probably not be necessary. We have no data at hand as to the amount of clearance between the piston and the cylinder favored by current practice, but it is always made quite a loose fit, probably several hundredths of an inch being allowed. In order to carry out the operation of reboring, the toolholder should be removed from the carriage and the cylinder centered on the latter, making it fast with lugs or straps, the cutting being done with a boring bar. Cast iron is considered the best material for piston rings and to make a set of new ones for the cylinder in question it will be necessary to cast a hollow cylinder of good, close-grained iron, making it slightly larger in diameter than that of the cylinder after reboring. This should then be machined inside and out, and the number of rings needed cut from it, again allowing for finishing. The edges should be ground to fit the grooves in the cylinder wall. The rings may then be cut, preferably in the form of a scarf joint, and holes countersunk on their inner faces to correspond with pins tapped into the bed of the grooves in order to prevent the rings from turning, thus causing the openings of the three rings to come in line and permit leakage. Some makers favor a piston ring of eccentric section, though probably the majority do not follow this plan of making them.

Current Consumption on Four-Cylinder Cars.

Editor THE AUTOMOBILE:

[515.]—Replying to letter No. 494, issue of "The Automobile" of December 6, in which Herbert Petersen states that he finds that his four-cylinder air-cooled car seems to take more current for ignition than a water-cooled car he previously had, I may say that I am now using a car with a four-cylinder engine, and find that it takes very little more current than one I formerly had with a single cylinder motor. In my opinion, the difference he speaks of is undoubtedly due to the longer duration of contact of the timer, as well as the make of coil. Some coils take more current than others. The length of the contact on most engines should be equivalent to about one-eighth of a revolution of the crankshaft.

Hoping this may be of some service to Mr. Peterson, I remain,

Corsicana, Tex. CLARENCE THOMAS (Auto-Doctor).

The above correspondent is correct in stating that the amount of current required by a car does not depend on the type of engine so much as the make of coil and the duration of the time of contact on the timer, but he might have added that the adjustment of the vibrators is largely responsible, in the majority of instances. If the duration of the contact is of the proper length as stated, and the vibrators are adjusted so as not to consume more than one-half to three-quarters of an ampere, by testing them with a low-reading ammeter, the battery will be found to give satisfactory service. Under the same conditions, however, a four-cylinder engine will take four times as much current as a single cylinder, Mr. Thomas' experience probably being due to the greater efficiency of the ignition apparatus of the four-cylinder car.

A Dry Battery and Dynamo Combustion.

Editor THE AUTOMOBILE:

[516.]—I have a four-cylinder car using batteries for ignition; the ordinary dry cell lasts but a very short time. I have read somewhere that dry cells in the same circuit with a dynamo would work as storage batteries. I wish to ask you if a dynamo, batteries, and a rheostat or resistance wire, according to illustration on another sheet, will work successfully, all wired in the same circuit; to start, the batteries will supply the current, but after the engine starts, the dynamo will supply it. With both dynamo and batteries the current will be too strong, but to guard against this, how would a rheostat or resistance wire work to limit the amount of current? Please notice my illustration on another sheet. If this will work successfully, it will free me from a great deal of ignition trouble. FRED E. PETTIT.

Peabody, Kansas.

While it is true that dry cells to a very slight extent can be "recharged" by sending a current through them as in the case of a storage battery, it is not practical to use them in the manner you describe. The objection to the rheostat or resistance wire is

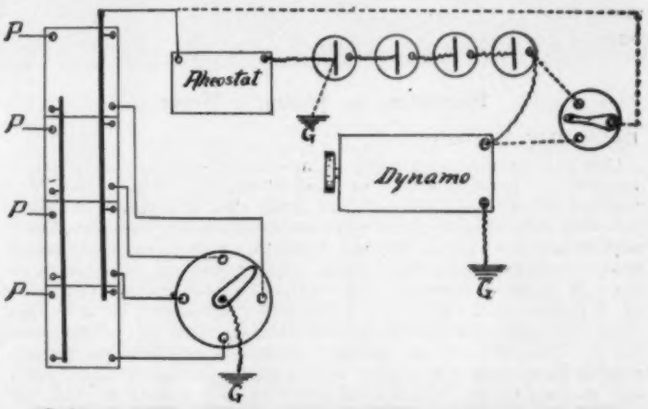


DIAGRAM WITH DOTTED LINES SHOWING PROPOSED CHANGE.
The rheostat will be taken out altogether.

that it simply uses up current, whereas on the average automobile there is no current to spare. A much better plan is to use the dry cells to start the car and the dynamo after it is started, using a two-way switch to cut the one or the other out of the circuit, as occasion may require. We are printing your drawing, with the modification we would make noted upon it.

Causes of Overheating.

Editor THE AUTOMOBILE:

[517.]—I have a 20-horsepower Olds touring car, and have been more or less troubled with overheating. The radiator is of the honeycomb type, and it seems to take a great deal of pressure to force the water through it, though in testing the cooler separately I have found that only a slight pressure is necessary to blow through it. When in use, steam pockets form in the heads of each of the cylinders, so that I have to open the relief cocks in the water jackets to permit its escape. Last winter I used salt to form an anti-freezing solution, and have also used artesian well water containing a slight percentage of bicarbonate of soda for the same purpose. Probably this has corroded some of the tubes or clogged them up. The pump is of the rotary type. Would be pleased to hear from you what can be done to remedy it.

Chaffee, N. D. P. O. PETERSON.

As you state that considerable pressure is required to force the water through the circulating system as a whole, but that only a slight pressure is required to blow through the radiator or cooler, it is very evident that there is an obstruction somewhere in the circulating system. It does not lie in the radiator itself, although it is probable the latter contains more or less scale and incrustation due to the nature of the anti-freezing solutions you have employed. From the fact that the steam only pockets in the cylinder heads, it would appear that the obstruc-

tion must lie somewhere in the jackets; and as a solution of brine not only rusts cast iron very badly, but also leaves a heavy deposit, according to its density and the rapidity with which the water is evaporated, there seems to be little doubt but that the water jackets of your engine are very much fouled. Several remedies are available for cleaning them, but the following will be found very effective: Make up a weak pickling solution, *i.e.*, about 10 per cent. sulphuric acid or commercial vitriol, to 90 per cent. water, always adding the acid to the water and never the reverse. This will heat in mixing and when cool is ready for use. After having removed any brass or rubber connections, fill the water jackets and plug the openings with wood, or screw an iron pipe nipple of the same size into them and put a cap on its outer end. Let this remain for several hours and then blow live steam through the jackets or force water through them in order to remove the loosened scale. Every trace of the acid solution must be thoroughly washed out with clean water. If some of the scale or dirt still remains it will be necessary to make a scraper to reach it through the ports and remove it by hand. Before going to all this trouble it will be as well to dismount the pump and the remainder of the circulating system and give every part of it a thorough cleaning. The hot brine solution you have used may have caused the inside lining of the rubber hose connections to disintegrate, and this would clog the passages.

Regulating or Timing a Motor.

Editor THE AUTOMOBILE:

[518.]—I have a four-cylinder, air-cooled car, planetary transmission. I have run this car something over 6,000 miles, with practically no road troubles. The latter part of the season I found low speed and reverse gears were somewhat worn; I sent to factory and bought a new set. To put them in I had to take out crankshaft. I intended marking shaft before removing in order to replace it in same position. The man I had helping me pulled out shaft before I had marked it. Since then I have had a lot of trouble. I took the car to a machinist who said he could fix it. He spent several days and did not improve things. I will describe the way engine acts: Starting engine, car standing, engine will run fairly, but will not speed as it should; throwing in low gear to start car, engine slows considerably. When changing to high gear, engine often stops or barely runs. On a good, level road car will not run over nine miles per hour, and will not climb even a slight grade on high gear. I am quite sure trouble is not with carbureter, commutator, coil, battery, or spark plugs. With latter removed from cylinders and fastened to wires, I get a good spark. I am quite sure trouble is with crankshaft, and that both inlet and exhaust valves do not close properly. Have had all valves out, and they seem in good condition, also valve springs. When engine is running with car standing or moving there is considerable escape of evidently a mixture of gasoline and air through air intake (which is located close to carbureter), also to some extent through exhaust valves, which sounds like back firing. I do not want any more tinker work—find it expensive and very unsatisfactory. Perhaps I should say intake valves in my car are on rear side of cylinders, exhaust valves on top.

I have had considerable practical experience with cars, as I have owned five, first and only cars ever owned in the town in which I live (Dunbarton, N. H.). As I have taken entire care of my cars, I have learned to run and to keep them in shape and also to make ordinary repairs and adjustments. If from my description you can, through the columns of "The Automobile," give me instructions as to regulating crankshaft, I shall be greatly obliged.

Also, what do you consider the best and most practical work on automobiles which will give full instructions as to care and regulation of the various parts of both steam and gasoline motors.

Route 2, Concord, N. H. C. F. N. STARK.

As you surmise, the motor has been improperly timed in reassembling it. The valves evidently do not open and close at the proper time and the timing of the ignition has probably been thrown out as well. The only remedy is to dismantle the engine again and set the camshaft where the designer intended it to be. As a rule, manufacturers make a practice of marking the rim of the flywheel to indicate the setting of the valves. Current practice as regards what is considered the best setting for the latter differs more or less, but in adopting the following method you cannot go far wrong and the engine should give as good results as ever it did. Take the cylinder next to the flywheel, and, having removed the bottom of the crankcase so that the position of the connecting rods can be seen, turn the engine over slowly until the crank of the cylinder in question is within a few degrees of the perpendicular on the down stroke. At this point the exhaust valve should begin to open and in a high-speed, air-cooled engine such as you have the amount of "lead" given the exhaust valve would probably cause it to open when the piston had completed from .8 to .85 of its stroke. Put the camshaft in place and engage its gears so as to give this result. As the cams are either integral with the shaft or made fast to it in some way, setting it so as to give the proper opening of the exhaust valve of the first cylinder will not alone cause the inlet valve of the same cylinder to open and close when it should, but likewise the valves of the remaining cylinders. Inspect the camshaft and see if any of the cams are badly worn, or if, through failure of their fastenings, any of them have shifted from their proper places. As they are usually pinned to the shaft, where not integral with it, this is not likely to have happened. When setting the valves see that the ignition is properly timed as well. In order to obtain the proper amount of advance the timer must be set so that when the piston is at the extreme end of its stroke or lower dead center—a point just subsequent to the opening of the inlet valve, which is also given more or less "lead"—it is still capable of being advanced ten or fifteen degrees. If you wish to be absolutely certain of the proper setting of the valves write to the maker of the car and ascertain exactly what standards were followed in its design. Regarding the latter part of your letter, the work that you will find most helpful will naturally depend upon the amount of knowledge you have already gained. We have accordingly sent you a list of publications ranging from elementary to the most technical.

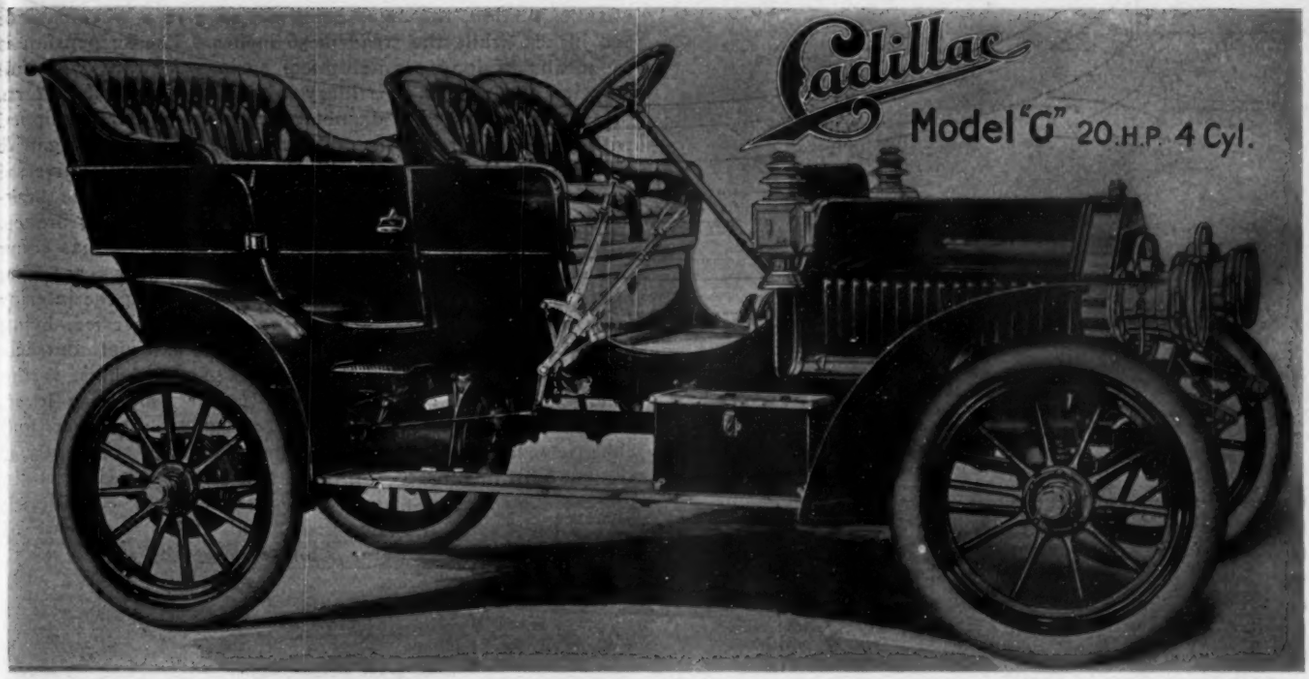
Adjusting Vibrators to Economize Current.

Editor THE AUTOMOBILE:

[519.]—Please tell me how to test the vibrators for the amount of current that should be used in a four-unit coil running on a six-volt set of accumulators, or if this question has already been treated in the shape of an article, will you kindly refer me to the latter and oblige. F. S. THOMPSON.

Dallas, Tex.

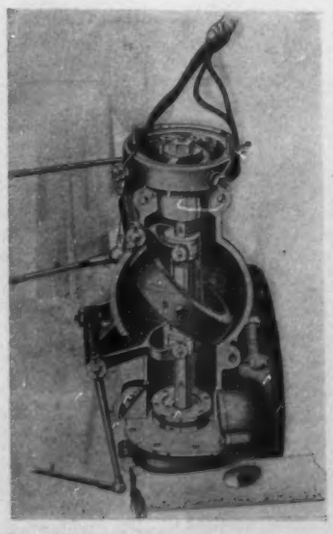
This may be done in several ways, any one of which may be more or less convenient according to the arrangement of the connections on your car. The object is to insert the ammeter, or testing instrument, in the low-tension circuit; that is, the wire leading from the battery to the coil. This may be done by stopping the timer on the contact representing the vibrator to be tested, then disconnecting the wire from that contact and putting the testing instrument in the gap, or by disconnecting at the coil, utilizing the break there to pass the current through the ammeter. The instrument must be in series, that is, so as to constitute a connecting link of the circuit in order that the entire battery current supplied to the coil will pass through it, and not merely bridged across the circuit as may be done in testing for voltage. As the scale of the average pocket ammeter is only roughly divided into fractions, and but few of them at that, it is not of great value for the purpose. If possible, a testing instrument calibrated in tenths of an ampere should be procured. The vibrator will begin to buzz as soon as the connections are made and the reading of the instrument will show how much current the coil is taking. If the adjustment is correct and everything is in good order this should not exceed .6 to .8 of an ampere, many coils working on even less than this. Increasing the tension of the vibrator, *i.e.* screwing down on the spring, increases the amount of current required, and in the majority of cases vibrators are adjusted to take more current than is actually required to do the work. The coil will fire the charge perfectly on a given amount of current and anything in excess of this is not only wasted but also tends to burn away the platinum points of the vibrator as well as the timer contacts. Each vibrator must be tested independently.



IN addition to the 30-horsepower, Model H, Cadillac, which will form the leader of the line to be put out under this well-known title during the season of 1907, the makers of the Cadillac announce that an entirely new car will be placed on the market, to be known as Model G, and which will be exhibited for the first time at the coming show in the Garden. It has been designed throughout with a view to meeting the needs of that large body of autoists who desire a medium weight touring car that is equipped with plenty of power and affords the same facilities for touring as the larger cars, but which is sold at a comparatively low price and can be readily maintained by its owner on a small outlay.

Motor Design.—In designing the motor the same features that have always characterized Cadillac construction in this respect have been adhered to. Thus the cylinders are independently cast and are provided with independent copper water-jackets. The dimensions are 4-inch bore by 4 1-2-inch stroke, the motor developing its rated capacity of 20 horsepower at a moderate normal speed. The cylinder heads are also independent and are attached to the cylinders themselves by means of right and left-hand threaded nipples. This system of building up the motor has numerous advantages, not the least of which is the ease with which repairs may be made with a minimum of expense for replacements. The use of independently cast cylinders with separate copper jackets gives very efficient cooling with but a small quantity of water. Both the connecting rods and the crankshaft are drop forgings of steel, the latter undergoing a special tempering process in the case of the crankshaft to render it tougher. The bearing surfaces are accurately ground and run in babbitt and bronze shell bearings arranged to permit of easy adjustment or removal if necessary.

The valves are mechanically operated, are interchangeable, and all are placed on the same side of the motor and operated from a single camshaft. The cams are specially hardened steel and the lower end of each valve rod is provided with a hardened steel roller and pin. The cylinder heads, which are cast integral with the valve chambers, are provided with relief cocks that may also be utilized for priming. All moving parts of the motor are made readily accessible by providing the crankcase with liberal-sized handholes. The crankcase is of aluminum, split horizontally, and cast with four vertical partitions, the latter also acting as supports for the bearings. The motor is supported by cross members on the frame, the three-point principle of suspension being adopted.



GOVERNOR AND COMMUTATOR.

Motor Accessories.—Nothing has ever been found superior to the splash system of lubrication, and this has been adopted in its most approved form—that of making the crankcase in the shape of individual compartments into which the connecting rods dip, so that the lubrication is not affected by the position of the car, as in ascending or descending a grade. The proper level of oil in the crankcase is maintained by a force-feed lubricator, which passes the oil through a sight-feed on the dash before it reaches the crankcase. A standard type of float-feed, automatic-compensating carbureter is employed, while the ignition is of the high-tension order, employing a unit quad coil mounted on the dash with a set of accumulators as the source of current. The timer is placed directly over the governor and is actuated by the same shaft that operates the latter, though there is no connection between the two. The governor is of the automatic ring type that has formed a feature of the Cadillac car for the past three years. It operates on the centrifugal principle, a heavy hollow ring normally maintained at an angle of about 45 degrees with the operating shaft that passes through its center vertically, tending to assume a horizontal position as the motor speed increases, thus acting on the throttle and keeping the motor speed constant under all conditions. This tendency is resisted by a small helical spring, the tension of which may be varied by the driver from the seat. The governor is enclosed in dust and oil-proof aluminum housing, and takes up very little space, while it is entirely automatic in operation. Con-

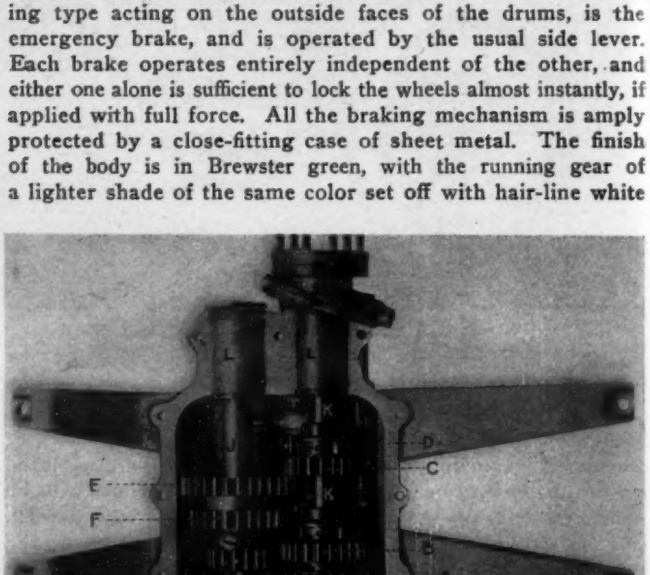
HUB BRAKES AND REAR SPRING SUSPENSION.

trol is centered on a stationary sector mounted above the steering wheel as usual, but there is also an accelerator pedal to open the throttle when a rapid increase of the motor speed is necessary, independently of the action of the governor. For cooling, a tubular radiator of large area is provided. The water is circulated by a helical or screw type of pump, belt-driven, a fan being employed to increase the draught through the radiator. Particular attention has been paid to the design of the muffler, to avoid any back pressure.

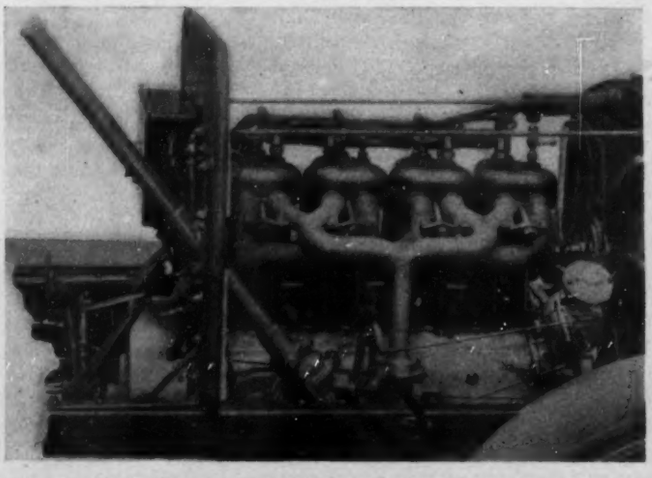
Transmission.—Although the three-speed planetary gear is still retained as a distinctive feature of the heavier Cadillac for 1907, the new Model G will be fitted with a selective type of sliding change-speed gear, designed on modern lines. Both the main drivingshaft and the lay or countershaft run on roller bearings in steel bushings. Great care is exercised in cutting the gears according to the Cadillac system of limit gauges, insuring their accuracy; they are then hardened by a special process rendering the teeth extremely hard as well as tough. This change-speed gear gives three speeds forward and reverse, the illustration showing the relative positions of the pinions when in the high-speed or direct-drive position. Control is by means of a single lever operating in the usual H-shaped quadrant, and when the direct-drive is employed as illustrated no gears are in mesh and the countershaft is idle. The gears themselves have been designed particularly with a view to prevent clashing.

Final drive is by means of a propeller shaft equipped with two universal joints, to specially cut and hardened bevel-gears contained within the rear axle housing, which also encases the differential. The driving axle is of the floating type running on roller bearings encased in a steel tube which serves to carry the weight of the car.

Running Gear.—The frame is of pressed steel of standard channel section, the axles being set to give a wheelbase of 100 inches, while the tread is 56 inches. The suspension is by means of long semi-elliptical springs forward with full elliptics in the rear. Artillery wheels of standard pattern, measuring 32 inches in diameter, are fitted and are equipped with 3 1-2-inch tires front and rear. Hartford or Morgan & Wright Dunlop detachable tires on the Midgely universal rims will be supplied unless otherwise specified. The braking equipment consists of two sets of double-acting brakes, centered on drums attached to the rear wheels, as has come to be the almost universal practice during the past year. One brake is of the internal expanding type engaging the interior face of the drum and is used for ordinary service, being applied by a pedal, while the other, of the external contracting type acting on the outside faces of the drums, is the emergency brake, and is operated by the usual side lever. Each brake operates entirely independent of the other, and either one alone is sufficient to lock the wheels almost instantly, if applied with full force. All the braking mechanism is amply protected by a close-fitting case of sheet metal. The finish of the body is in Brewster green, with the running gear of a lighter shade of the same color set off with hair-line white striping. In full running order, but without lamp equipment, the new Model G lists at $2,000, either as a touring car or runabout, while the stripped chassis is sold at $1,900.



SLIDING GEAR TRANSMISSION EXPOSED TO VIEW.



MOTOR OF THE CADILLAC MODEL G, 1907.

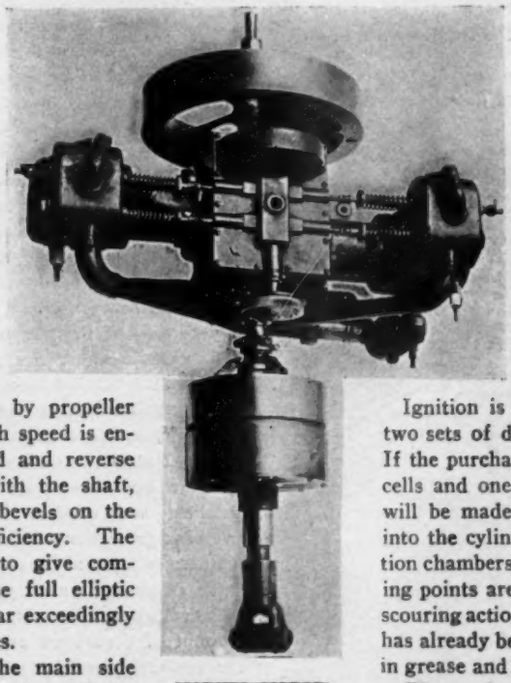
The remainder of the Cadillac line for 1907 will consist, as already mentioned, of the Model H, 30-horsepower touring car, listing at $2,500, or at $3,600 as a limousine; the Model K runabout at $800; the Model M, light touring car at $950, or when equipped with a folding tonneau, at $1,000; as a coupé at $1,200, or as a light delivery wagon at $950. All the various modifications of Models K and M are mounted on the same 10-horsepower single-cylinder chassis that has been specialized for several years past by the makers of the Cadillac cars. No changes, except in minor detail, have been made in the construction of either the motor or any other part of this chassis for the coming year.

The 30-horsepower, four-cylinder Model H is also continued with but few if any changes from the design used during the past year. The same characteristics of motor construction that mark the engine of the Model G are adhered to throughout, so that as a matter of fact both motors are the same, barring the difference in their dimensions and rated output. The cylinders of the Model H measure 4 3-8-inch bore by 5-inch stroke, and the normal motor speed is also moderate in this case. Hess-Bright ball bearings to the number of ten in all are used on the front wheels, transmission shaft and rear axle.

ANOTHER DETROITER: THE MARVEL RUNABOUT

FROM Detroit, where innumerable automobiles first see the light of day, comes the Marvel runabout, a light two-passenger machine built on natty lines and propelled by a four-cycle two-cylinder opposed motor placed in front under the bonnet. The car is built by the Marvel Motor Car Company, of Detroit, and the concern devotes its entire attention to this one model, believing that the best results at the least expense are to be obtained by concentrating all their energies on a single type.

With its well-designed bonnet that looks as though it covered plenty of power—which it does—its comfortable, divided front seat, its sloping rear deck and sturdy-looking artillery wheels, the machine presents an attractive and substantial appearance, and it belongs to a class that is popular, and deservedly so. The motor is rated at 12-14 horsepower and the car weighs 1,300 pounds, so that there should be ample power for all-around work and plenty of energy for hill climbing. Drive is by propeller shaft and bevel gears, and when the high speed is engaged the drive is direct, the two-speed and reverse planetary transmission rotating solid with the shaft, the only gears in operation being the bevels on the rear axle. This should give high efficiency. The wheelbase is 84 inches—long enough to give comfortable riding in combination with the full elliptic springs, and short enough to make the car exceedingly handy and easily managed in tight places.



MARVEL MOTOR.

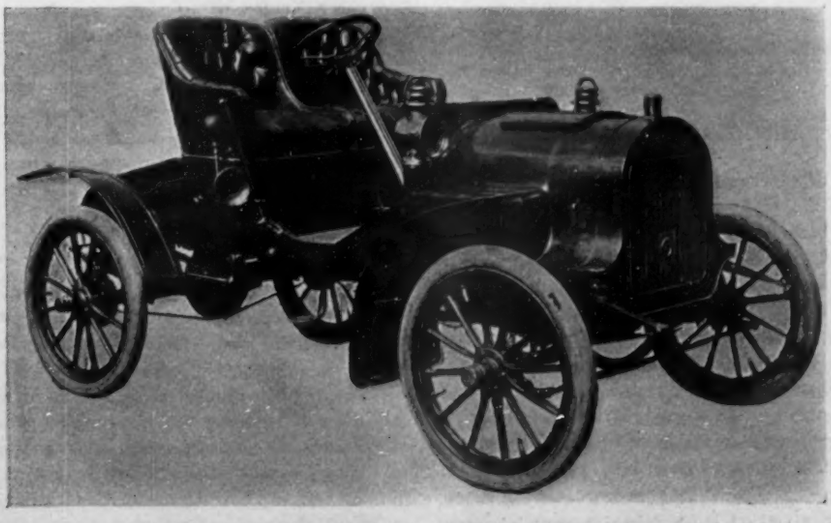
The motor is hung directly from the main side frames, the points of attachment being the cylinder heads. The heads, water jackets and valve chambers are cast integral, and flanges are cast on the cylinders through which bolts pass to secure the cylinders to the rectangular crankcase. The cooling water is circulated by thermo-syphonic action; the radiator is of the vertical finned-tube type and is of ample size to give the requisite cooling surface. The arrangement of the valves and their operating mechanism is interesting, as the illustrations show. All the valves are mechanically operated and are on top, where they can be easily reached if, for any reason, it becomes necessary to remove them. Valve chambers are well water jacketed. The single camshaft carrying the cams for all the valves is journaled in the removable top part of the crankcase, and the guides for the push-rods are attached to the camshaft housing as shown; an extension of the top of the crankcase covers the large gear on the camshaft, and on the opposite or rear end of the camshaft is mounted the timer, of a type that is entirely dustproof and runs in grease. By removing the screws that hold the top of the crankcase in position all the valve operating mechanism can be removed entire, without disturbing any adjustments or removing other parts, and when this is done the cranks and connecting rods are exposed and can readily be inspected or, if necessary, removed. As the entire motor is exposed when the hood is opened it will be seen that accessibility is a strong point in the Marvel car. Accuracy of finish of the cylinders, pistons and piston rings is assured by first machining them with care and then giving the final finish by grinding—the accepted practice where a high degree of accuracy is required. Opposite each valve, in the heads of the valve chambers, are screw plugs, which, when removed, permit the withdrawal of the valves after their springs have been taken off. Thus it is easy to get at the valves for inspection or for the grinding that all valves require from time to time. A compression relief cock is located in one of these plugs in each cylinder.

Ignition is by jump spark; current is derived from two sets of dry cells, arranged to be used alternately. If the purchaser so desires he may have one set of dry cells and one storage battery, though an extra charge will be made for this. The spark plugs are screwed into the cylinder so that they project into the combustion chambers close to the inlet valves, where the sparking points are exposed to the cooling influence and the scouring action of the incoming charges of fresh gas. As has already been stated, the timer is dustproof and runs in grease and is carried by the rear end of the camshaft.

The explosive mixture of gasoline vapor and air is furnished to the engine by a float-feed carbureter of an automatic type, which regulates itself to meet the varying demands of the motor as the speed changes. The intake piping is simple and direct, there being simply a short pipe from the carbureter and a straight branch leading to each cylinder. The timing of the ignition and the regulating of the throttle, which is incorporated with the carbureter, are controlled by small levers on the steering column in the usual manner.

The flywheel is carried on the forward end of the crankshaft, while a rearward extension of the shaft carries a cone clutch and a two-speed and reverse planetary transmission. The clutch is a leather-faced affair, and is an unusual feature in a car of this type with planetary gear. All the gears in the transmission are of the spur type, there being no internal gears; the teeth are wide enough to be strong and durable. The entire speed-shanging mechanism is exceedingly neat and compact.

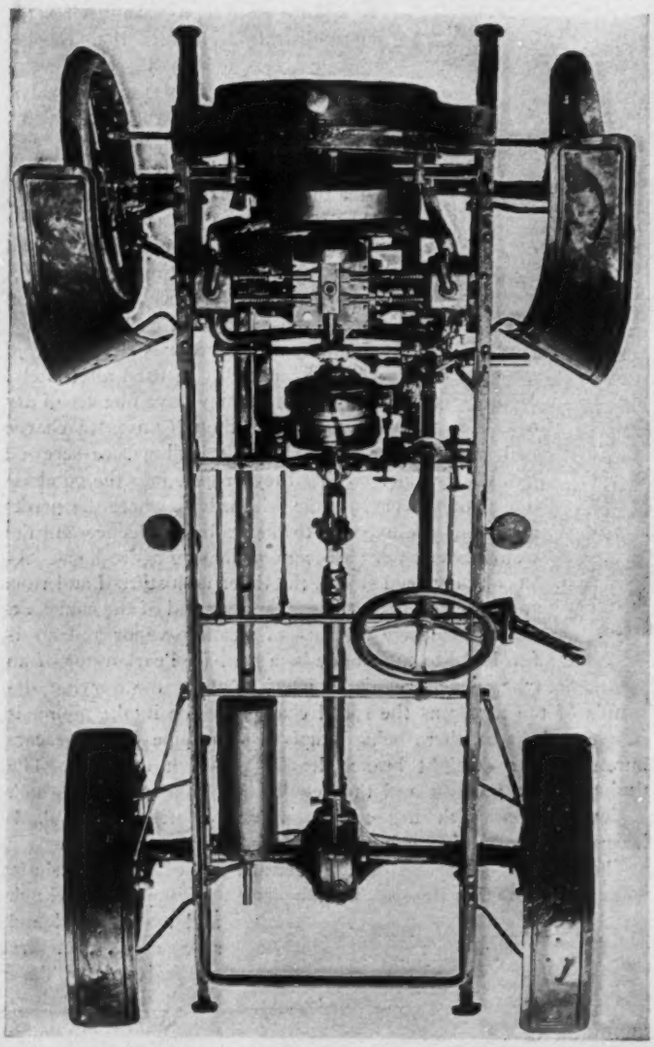
From the transmission gearcase a propeller shaft extends rearward to the rear



FULL VIEW OF MARVEL 12-14-HORSEPOWER RUNABOUT.

axle, which it drives through the well-known bevel gear arrangement. There is one full universal joint in the propeller shaft. The rear axle is equipped throughout with roller bearings, so that friction is reduced to a minimum. The drive is of course direct when the high speed is engaged, the planetary gear revolving solid, like an extra flywheel and no gears being in operation except the bevel gears on the rear axle.

Angle steel, of sufficient weight to be stiff and strong, is employed in the construction of the main frames of the car, which are straight from end to end; there are three cross members, also of angle steel, to stiffen the framing and help support the motor and transmission mechanism. The four springs, all of the full elliptic pattern, are placed directly under the frames without offset.



HOW THE CHASSIS OF THE MARVEL RUNABOUT LOOKS.

Brackets for the support of the steps, fenders and so on are hot-riveted to the frames. The front axle is made of heavy steel tubing, with the steering knuckles securely held in the ends.

The wheels are of wood, of the standard artillery pattern, with twelve spokes each; they are 30 inches in diameter and are fitted with detachable rims to carry 3-inch tires both front and rear.

The brakes are contracting bands working on drums bolted to the hubs of the rear wheels; they are controlled by a pedal, while a second pedal serves to control the clutch and the usual side lever is used for manipulating the change-speed gears. The steering gear is irreversible, a worm mechanism being used. The sector carrying the spark and throttle levers is carried on the steering column under the wheel.

The speed of the car is given as from 4 to 35 miles an hour. The standard finish is Asiatic red.

MAKING AND MARKETING DENATURED ALCOHOL

To clear up much of the general misapprehension of the working of the statute providing for the marketing of denatured alcohol tax-free, which goes into effect the first of the year, Internal Revenue Commissioner Yerkes has been at pains to explain some of its provisions. "There is no objection to a farmer manufacturing alcohol in his back yard if he wishes to establish a distillery there," he says in reply to the criticism that the law favors an existing monopoly. However small the plant, he will be required to construct it in accordance with the general laws and regulations governing the subject. He will be required to give a bond to prevent him from defrauding the government and he will be required to establish a distillery warehouse; to deposit the spirits produced by him therein; to establish a denaturing warehouse and to pay tax or denature, just as he may wish, on the alcohol produced by him. If any one will take the trouble to investigate he will find that, in my opinion, the laws and regulations relating to the manufacture of alcohol in Germany do not differ to any great extent from the laws and regulations in this country.

"This office knows of no process by which alcohol can be manufactured except by distillation, and as regular distilleries are the only kind recognized by the law, alcohol manufactured under the supervision of this department must be manufactured at regular distilleries. There are absolutely no limitations as to the size of a distillery that can be operated under the law. There are over 1,000 distilleries in operation now, at each of which the daily spirit producing capacity is less than 30 gallons. Many of these were set up on an outlay of less than $200. So far as the internal revenue laws are concerned, either in theory or practice, the smallest and crudest distillery can produce alcohol, if as a business proposition it is deemed advisable to do so. The small distilleries have always been treated by this department with the same consideration as the larger ones."

In response to a request for information as to the probable amount of denatured alcohol that will be consumed during 1907, the commissioner states that, "having absolutely nothing to base an estimate upon, it is not possible for me to make an estimate as to the quantity of denatured alcohol that will be consumed in that way. No formal applications have as yet been made to distilleries for approval of denaturing bonded warehouses. Such applications could not be filed for the reason that the proper blanks have not as yet been placed in the hands of collectors. At present there are forty distilleries in the United States manufacturing what might be termed commercial alcohol."

MICHIGAN WILL EMPLOY CONVICTS.

GRAND RAPIDS, MICH., Dec. 24.—Since the establishment of the Michigan good roads department, seventeen months ago, the work of improving and rebuilding the highways of the State has progressed most satisfactorily. In the report of Horatio S. Earle, State Highway Commissioner, which he will make to the legislature of 1907, the results of the work done in the automobile State are shown. He reports 52 miles of stone road built, 33 miles of specially prepared gravel road and 90 miles of gravel and clay road.

The commissioner estimates the value of roads constructed under the directions of his department at $163,177. The State has paid in rewards $61,826, and on completion of the roads now in course of construction will pay $77,082 additional. The total expenses of the department have been $13,436.51. This includes $1,500 for maps.

The convicts of the State will soon be employed in crushing stone for its roads. As soon as the present contracts with contractors for the manufacture of articles in the three prisons expire many of the convicts will be put at work in the making of good roads. The Michigan Federation of Labor has heartily endorsed this project by working for the Manzelman bill, introduced in the legislature of 1905.

PHASES OF CLUB LIFE AT CHRISTMASTIDE

St. Louis Automobile Club Presents Its New Bill.

JEFFERSON CITY, Mo., Dec. 22.—Governor Folk has been made the recipient of the new bill which was drafted by the St. Louis Automobile Club for submission to the next session of the State legislature, which meets immediately after January 1. The bill is a comprehensive document and asks for the repeal of the automobile act of 1903, and the enactment of the proposed measure.

The new act provides that owners of automobiles shall register the same with the Secretary of State, and upon payment of an annual fee of $2 obtain a license. No other license shall be exacted for the use of such machines upon any of the public highways of the State. Chauffeurs must also be registered with the Secretary of State, and no unregistered chauffeur shall be allowed to operate an automobile. A license card shall be furnished by the Secretary of State and cars must be numbered with Arabic numerals three inches in height and three-eighths of an inch in width. Each automobile must carry two lamps burning white lights.

In case of accidents it is not only the duty of the chauffeur to give his name and the number of the machine, but the name of the owner thereof and the names of occupants of the machine when the accident occurred. The maximum speed upon the highways is limited to 25 miles per hour and within the limits of municipalities to ten miles an hour. Where automobiles are sold or exchanged, a provision is made for noting the transaction with the Secretary of State. Chauffeurs are prohibited from operating automobiles without the consent of owners.

One of the objects of the bill is to get rid of the present system, which requires separate licenses for each county, and also for some of the cities. Under the present law an automobile which is driven much about the State soon resembles Joseph's coat of many colors. It is generally conceded that the new bill as a whole is a very acceptable document and it is hoped the measure will become a law.

Proposed Amendments to the Pennsylvania Auto Law.

HARRISBURG, PA., Dec. 24.—The Pennsylvania Motor Federation is preparing to have introduced into the next session of the legislature five important amendments to the present automobile law, which are set forth as follows:

1. A more elastic provision regarding the speed limits in the country districts as well as in cities.
2. The registration of chauffeurs.
3. Increasing the length of time for which licenses are granted from one to two years.
4. A reciprocal arrangement by which automobilists from other States may drive their autos in Pennsylvania for a period of at least ten days on their native State license on condition that these States extend the same courtesy to Pennsylvania motorists.
5. The increase in the responsibility of drivers in regard to accidents.

These amendments represent the consensus of opinion among the automobilists of the State, and they hope that at least a portion of them will be acted upon favorably.

Motor Boat Club to Have New Quarters.

NEW YORK, Dec. 24.—It has just been announced by the board of governors of the Motor Boat Club of America that its new quarters will be located at some convenient point on the Hudson River. The committee on ways and means is making every effort to purchase a site in time to have the new building ready for the coming season. Among those recently admitted to membership are George Scott Graham, Commodore Frank Maier, E. S. Mendelson, W. L. Stow and E. A. Riotte.

Club Life Is Active In the City of Brotherly Love.

PHILADELPHIA, PA., Dec. 24.—At the last meeting of the Quaker City Motor Club it was voted to engage a suite of three rooms in the Hotel Majestic, this city, for permanent club headquarters. There was some sentiment expressed for a separate clubhouse, but such a movement was deemed impractical at the present time, owing to the great expense. Chairman Penrose, of the committee on constitution and by-laws, reported that a charter had been applied for under the State laws. The membership of the club has reached a total of 235, over 50 names having been added within the past few weeks. The club is a striking example of infant precocity in club life. Organized scarcely six weeks ago, it has certainly made a record second to none in the country.

An endurance run to Harrisburg and return on January 1 has been arranged by the club. For this event a $500 silver cup is offered as a perpetual trophy by McDonald & Campbell. In addition, H. B. Stillman, of the Mercedes company, announced that he would give a gold medal for cars costing under $1,500 which enter the test, similar to the Deming trophy of the Glidden Cup tour. The rules provide that each motor must carry four passengers, so that Mr. Stillman's offer will give the runabouts and smaller

ROAD BETWEEN HARRISBURG AND LEBANON.
Conditions Encountered by the Racing Committee of the Quaker City Motor Club, when going over the route of New Year's Run, Philadelphia to Harrisburg and return.

cars a chance. The racing committee of the club went over the course December 16 and decided on checking stations at the following points: Norristown, Pottstown, Reading and Lebanon. The distance from Philadelphia to Harrisburg is 104.1 miles.

The Automobile Club of Philadelphia is daily adding to its membership, which at the present time numbers nearly 360. When the club left its old quarters in the Real Estate Trust Building its membership was only about 170. Since that time the additions have been steady and new members are now being taken in at an average rate of one each day. One of the club's present objects is to swell the membership to 400 by the date of the next annual meeting in March.

Akron Automobile Club Takes New Lease of Life.

AKRON, O., Dec. 22.—A most enthusiastic and successful meeting was held in this city the evening of December 18 for the purpose of rejuvenating the Akron Automobile Club, and to start a movement for better roads. President Sholes and Secretary Goddard, of the Cleveland Automobile Club, were present and made addresses. Secretary Goddard, who was interested for years in the fight waged for good roads by the Massachusetts automobilists, has started a good roads movement in Cleveland and the northern part of this State, which promises to grow into

a great thing for better highways, especially if co-operation can be had with the State aid movement, for which money has been appropriated by the Legislature and which is beginning to receive general attention throughout the commonwealth. In his talk at the meeting here Mr. Goddard said: "We must get the farmers interested. There seems to be an idea prevalent that country people display nothing but hostility to automobilists. Nothing is farther from the truth. They should be convinced that better roads will be a benefit to the community, and their support should be solicited."

President Sholes said that it is not only a question of better roads, but the present laws governing automobiles and automobile owners need revision. "The only way we can accomplish anything is to have concerted action over the State," he said. "Reports from all cities where clubs have been organized are to the effect that they are prepared to do their utmost to have this matter brought to the attention of the legislature, and as our State organization is stronger than ever before I don't see why this cannot be done."

A committee consisting of S. G. Rogers, A. H. Marks, of the Diamond Rubber Company, Fred W. Work, Senator N. O. Mather and A. Auble were chosen to incorporate the club, and a petition was signed by all present asking the city council to pass an ordinance to make it compulsory for all vehicles, bicycles and automobiles to carry lights after dark.

Cleveland A. C.'s Fund for Model Road Is Growing.

CLEVELAND, Dec. 24.—Secretary Asa Goddard, of the Cleveland Automobile Club, has returned from Cincinnati, where he was the guest of the Automobile Club of Cincinnati. While in that city Mr. Goddard delivered a lecture to the local club on the work of road improvement now under way under the auspices of the Cleveland club.

At the last meeting of the committee of the Cleveland Automobile Club in charge of the good roads movement the local situation was carefully gone over. Although the subscription lists for the improvement of the good roads has only been in circulation a short time, over $7,000 has been solicited. This amount represents only a few individuals. A few of the people who were asked to contribute gladly pledged themselves for $1,000 each, so that the amount was quickly swelled.

Surveyors are at work for the club on the three-mile strip extending from Chardon road east on Euclid avenue, and in the early spring work will be begun on a new roadbed there. It has not been definitely decided as yet what the road will be made of, but it will probably be of gravel. Every precaution will be taken to mitigate the dust nuisance.

The Chicago Motor Club Joins the A. A. A.

CHICAGO, Dec. 24.—Formal application for membership in the American Automobile Association and the Illinois State Automobile Association has been made by the Chicago Motor Club. The organization, which has only been organized for three months, already has a membership of 107.

Contracts for the interior furnishing and decoration of the new home of the Chicago Automobile Club, now in course of erection on Plymouth court, will probaby be let during the present week. The special committees in charge of the different divisions of house equipment have about completed their estimates and are submitting them to the board of directors.

Another Automobile Club Organized in Texas.

SEABROOK, TEX., Dec. 22.—A club has been formed here with Col. C. W. Rugers as president. It is known as the Seabrook Automobile Club and gives promise of great activity. There are now two auto clubs in Harris county, the Houston Automobile Club and the one here. The new shell road from Seabrook to Houston will, when completed, give a great impetus to automobiling.

THE AUTOMOBILE CALENDAR.

AMERICAN.

Shows.

Jan. 5-12.....—Philadelphia Automobile Show, First Regiment Armory, Philadelphia Automobile Trade Association.
Jan. 12-19.....—Annual Automobile Show of the Association of Licensed Automobile Manufacturers, Madison Square Garden, New York City.
Jan. 19-26.....—Baltimore (Md.) Automobile Show of the Automobile Club of Maryland and Dealers' Association.
Jan. 21-28.....—Los Angeles, Cal., Morley's Rink, First Automobile Show of the Automobile Dealer's Association of Southern California.
Jan. 28-Feb. 2..—Washington (D. C.) Automobile Show, Dupont Garage, Washington Automobile Dealers' Association.
Feb. 2-9.....—Chicago Automobile Show, Coliseum and First Regiment Armory. S. A. Miles, manager, 7 E. 42d Street, New York City.
Feb. 11-16.....—Detroit, Mich., Sixth Annual Automobile Show, Light Guard Armory, Tri-State Automobile and Sporting Goods Association. E. E. McMasters, manager.
Feb. 18-23.....—Fifth Annual Automobile Show, Buffalo, Convention Hall. D. H. Lewis, manager, Teck Building.
Feb. 25-Mar. 2..—Portland, Me., Second Annual Automobile and Power Boat Show, The Auditorium.
March 2-9.....—Chicago, Second Annual Power Boat Show, Seventh Regiment Armory. W. C. Andrews, manager, 19 E. Huron Street.
March 4-10.....—Kansas City, Mo., First Annual Automobile Show, Convention Hall. Frank L. Woodward, manager, Willis Wood Theatre Building.
March 9-16.....—Boston Automobile Show, Mechanics Hall and Horticultural Hall, Boston, Automobile Dealers' Association. Chester I. Campbell, manager.
March 18-23....—Providence (R. I.) Automobile and Power Boat Show. Infantry Hall. Frederick M. Prescott, manager.
April 6-13.....—Montreal, Canada, Second International Automobile and Sportsman's Exhibition. R. M. Jaffray, manager, 309 W. Notre Dame Street.
April 8-13.....—Pittsburg, Pa., First Annual Show of the Pittsburg Automobile Dealers' Association, Duquesne Garden.

Race Meets, Hill Climbs, etc.

Jan. 1.....—Philadelphia-Harrisburg Endurance Run of the Quaker City Motor Club.
Jan. 22-26.....—Ormond-Daytona (Florida) International Race Meet, Florida East Coast Automobile Association.

Motor Boat Races.

Jan. 29-Feb. 1..—Palm Beach, Fla., Annual Races of the Palm Beach Power Boat Association.

FOREIGN.

Shows.

Jan. 5-12.....—Dublin Motor Show, Irish Automobile Club.
Jan. 18-26.....—Birmingham (Eng.) Automobile Show.
Jan. 25-Feb. 2..—Liverpool Motor Show, Tournament Hall.
Feb. 1-9.....—London, Crystal Palace Motor Show.
March 7-16.....—London, Olympia Commercial Vehicle and Motor Boat Show.
April 6-13.....—London, Agricultural Hall Motor Show.
May 15-26.....—Third Annual Swiss Automobile and Cycle Show, Zurich.

Race Meets, Hill Climbs, etc.

April 21.....—Targa Florio Tour (Sicily), Auto Club of Milan.
May 29-June 1..—Irish Automobile Club Reliability Trials.
June 24-29.....—Scottish Reliability Trial, Scottish Automobile Club.
Aug. 11-20.....—Coupe d'Auvergnes, France.

Dates Not Yet Settled.

June .....—Grand Prix, Automobile Club of France.
June .....—Herkomer Cup, Automobile Club of Bavaria.
June .....—German Emperor's Cup, Imperial Automobile Club.

OFFICIAL RULES OF THE GRAND PRIX

PARIS, Dec. 15.—The thirty-eight articles of the official regulations governing the Grand Prix of the Automobile Club of France, just issued by that body, are but an amplification of the forecasts given from time to time in THE AUTOMOBILE.

The race will be run in one day, the date of which will be fixed later, over a circuit of about 500 miles. Three cars can be entered by any manufacturer, all firms constructing under the same license to be considered as one, whether they are in the same or different countries. Entries are received at the Automobile Club of France up to 6 o'clock on the evening of February 1, 1907, at the rate of $1,000 per car. Up to three weeks before the race engagements will be received on payment of double fees.

All cars are eligible to compete without any limitation of weight or power. The only condition is that a maximum quantity of fuel, in the proportion of 30 liters per 100 kilometers (6.6 gallons per 62.13 miles) shall be given to each competitor. Instead of weighing-in, the day before the race will be devoted to measuring out. Each competitor will bring enough gasoline, in the proportion of 30 liters per 100 kilometers, which will be put into a vessel and measured. The gasoline tank of the car will then be fitted and the remaining fuel, if there is any, placed in a metal vessel, sealed and put at the disposition of the driver on day of the race.

Eight Days Before the Race.

Eight days before the race the tank, piping, taps, etc., must be submitted to the Sporting Commission for verification; any subsequent change will be considered an attempt to fraud and may entail disqualification. Manufacturers are requested to make tanks as simple as possible for easy verification. The refitting of tanks will take place at one fixed station. A commissioner will examine the seals before opening the tanks, and when they have been filled will seal them up again as at the start. Any attempt at fraud will entail disqualification of driver and mechanic; and should it be proven that the manufacturer is party to the transaction he will be fined $2,000 and disqualified by the Sporting Commission. Two persons must be carried on the car side by side, and every car must be fitted with reverse gear.

All repairs, changes of tires, fitting of tanks, etc., must be done by the two men on the car. There will be a single station for oil, gasoline, tires, spare parts, common to all competitors, and indicated in advance. Competitors taking help from any other place will be disqualified.

The exhaust must be horizontal, at the rear of car, and so placed as not to raise dust.

Drivers and mechanics may be changed at the end of each round, if necessary, but always under the control of a commissionaire. Reserve drivers and mechanics must be registered in advance with the Sporting Commission. On any part of the course the mechanic may replace the driver if necessity demands it, in case of an accident, for instance.

The engagement between driver and manufacturer must be made known to the Sporting Commission as soon as it is entered into. No subsequent changes will be permitted without consent of both parties and approval of the club.

Tire Contest in Connection.

The tire contest run in connection with the principal event considers only the outer shoes. Eight days before the Grand Prix manufacturers must notify the club the tires they intend to employ. To compete in the tire competition all four wheels must have the same make of tires. As many tires as it is thought will be needed for the race must be sent to the Sporting Commission to be stamped. They will be given out as needed any time during the race and a receipt obtained. To participate in the tire competition a speed superior to nine-tenths of that of the winner in the speed test must have been maintained. At the end of the race an account will be made up of the number of tires used, including those on the machines at that time, and the winner will be the one having used the smallest number. Entrance fee for tires is $400. This sum provides for any number of cars and gives a right to a place on the tire station. Engagements are received up to February 1, 1907, at ordinary fee, and until three weeks before the race at double fee.

Three Thomas Cars in Grand Prix.

M. Gustave Caillois, Paris agent of the Thomas Company, seen by THE AUTOMOBILE representative, said that he hoped to have a team of Thomas cars in the 1907 Grand Prix. If the American team were entered the racers would be built early, so as to give them a thorough trying out and tuning up on the road before the race, as is done by all French firms. There will be no repetition of the Vanderbilt blunder, when machines were brought to the starting line a few hours after they left the factory.

Notwithstanding M. Charley's assertion that Mercedes has abandoned racing, we have it on good authority that the great German firm will be at the starting line in 1907. Alexander Burton will form one of the Mercedes team.

Italy May Not Be Represented.

Information has just been received in Paris from Turin to the effect that the Racing Board of the Automobile Club of Italy had decided not to compete for the French Grand Prix on account of the special regulations entailing the construction of a type of car unsuited for any other race. The board decided to organize the race for the Florio Cup at Brescia the first Sunday in September on the same lines as the race for the German Emperor's Cup. From inquiries made among Italian constructors at the Paris Salon there appears to be a difference of opinion between individual manufacturers and the national club, many of the former declaring that they will certainly race.

Course Near Fontainebleau.

A 34-mile circuit in the neighborhood of Fontainebleau, about 35 miles from Paris, has been proposed for the Grand Prix. The course starts from a point on the borders of the town and describes three distinct loops around the western side of it. There are several hills with 11 and 12 per cent. gradients. Except on one stretch which can easily be widened there is everywhere a width of 65 feet. A deputation from the Racing Board will visit the circuit on Sunday and report to the club.

PROGRESS OF THE MOTOR PARKWAY.

Just what form of road construction will be employed on the Long Island Motor Parkway, is still a subject of discussion with Manager A. R. Pardington and his associates on the Plan and Scope Committee, and, though nothing definite has been decided, it seems probable that some kind of macadam will be adopted. Offers of voluntary grants of rights of way in Nassau County to the extent of four miles have been received by Treasurer Thompson from the Chairman of the Board of Supervisors of that county, the stretch including a section of the proposed route near Hicksville. Mr. Thompson was also visited by Perry Belmont during the past week, who came to present arguments from the Board of Trade and other interests in Riverhead, requesting that the highway be extended to that town. Should this be done it is possible that an extension might be built to Southampton or even beyond to accommodate summer residents along the shore.

The Automobile

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Valuable for Those Who Intend to Tour Abroad. Probably there is scarcely an owner of an automobile in this country who does not at some time hope to drive his car over the grand roads of France, which country has successfully studied the question of good roads in advance of any other nation in the world. We have arranged for a series of foreign touring articles by Francis Miltoun, an American who has driven a car over untold kilometers of French and other European roads. The information which will be contained in his articles is especially prepared for the American who goes abroad, and it will be particularly valuable for the reason that it is written by a man who has gone through the mill of experience and knows exactly what he is talking about.

In this week's issue the story is of the building and maintaining of the highways of France, explaining in detail how the country came to secure such a profitable blessing and how it is retained for the general good. Roadmaking is a science to the French, and whether we shall ever be able to duplicate their great system of highway construction and repair is a question, though there is no doubt but that we will have in the next few years miles of excellent road over which to drive our automobiles. The peasant of France is a factor in its good roads and a substitute for him we have not in this country. We shall have, however, the first motor parkway in the world, and that there will be many more such is generally recognized by those who have given the subject any consideration. Some day the horse may be off the road and its owner obliged to contend for a side path of some kind that will take the horse-drawn vehicle out of the path of the time-saving motor-traveler.

Producer Gas as Fuel Substitute. For all but the very smallest plants using an internal combustion motor as a prime mover, the installation of a gas producer has been found to effect a saving, not alone far in advance of that obtainable with the use of even the very cheapest form of liquid fuel, but likewise in excess of steam when employed under the most modern and economical conditions. In other words, one pound of coal or coke burned in a gas-producer has been found to be capable of developing considerably more power than the same amount of fuel burned under a boiler for the production of steam, while the attendance required is vastly less. The bulk and weight of the apparatus required to convert coal or coke into a combustible gas have hitherto appeared to constitute insurmountable obstacles to the adaptation of any such system for the use of the power plant of a road vehicle.

Regardless of what its economy and other advantages from a utilitarian point of view may be, it is evident that it is totally unsuited to the needs of the pleasure vehicle, though suitable liquid fuel may continue to increase in cost until it has reached a point where it would be otherwise prohibitive. This is not the case with the commercial vehicle, however, and the advent of a motor omnibus in England equipped with a gas-producer plant would appear to mark the dawn of a new era where the latter is concerned. Coke is the fuel used and tests have shown that it is possible to run a 40-horsepower engine on a consumption of slightly less than 20 pounds per hour, or not quite half a pound per horsepower hour. The cost was approximately 6 cents, as compared with 40 cents for gasoline, figuring the consumption as two gallons, which would in all probability be exceeded.

There Are Many Cars of Less Than Four Cylinders. In casting his pearls the average technical adviser who takes it upon himself to lead the blind appears to overlook the fact that there are other than four-cylinder engines in use, and accordingly confines his priceless morsels of knowledge to emergencies and conditions only arising in the use of the latter. There is no way of estimating the number of single and two-cylinder cars running in this country to-day offhand, but it is perhaps safe to say that in the aggregate they at least equal, if they do not greatly surpass, the number of four-cylinder cars in constant use. Whatever their disadvantages, the fact that the single and twin-cylinder cars represent types that will always hold a place of their own cannot be ignored. In economy of maintenance, small cost of repairs and simplicity of operation, the comparatively slow-going one-lunger and its bigger brother of two cylinders possess advantages that tip the balance heavily in their favor when they come to be weighed in comparison with other types.

They are somewhat sluggish in starting, deliberate on the hills, and their average speed on long runs is necessarily low, but that they are capable of many things which the high-powered, multi-cylindered car is not equal to in every instance, was amply demonstrated last summer, when representative types of single and twin-cylindered cars of the simplest construction known to the automobile builder survived with honor a gruelling test that left cars of many times their power and price stranded by the roadside. It is not to be contended for a moment that the light car of this type will ever be fashionable, nor, on the other hand, that its popularity will ever prove a serious menace to that of the four-cylindered type. But it is well, nevertheless, in this day of multi-cylindered tendencies, when the matter of still further increasing the number of cylinders is the question of the moment, to bear in mind that the beginnings from which those same many-cylindered engines originally sprung are not extinct by any means. Let us not forget that there are such things as one and two-cylindered motors and that there are men who own and run them to the extent of many thousands. Whether considered in the aggregate, or in any other light, the interests of this class of the motoring community should not be held as secondary in importance.

EUROPEAN TOUR FOR AND BY AMERICANS.

France, Spain, Italy, Austria and Germany are embraced in a tour of Europe, which Georges Dupuy, the well-known automobile authority, has planned for next summer. It is anticipated that the event will give the American manufacturer an opportunity of demonstrating that the American car has reached that stage of perfection which places it on an equality with its fereign rival, for certainly a 4,000-mile journey of such a trying character, and similar to one that the European makers avoided in postponing the proposed 1906 European Circuit, would prove a most excellent advertisement. Mr. Dupuy's plans are as yet drawn in a general way, and he desires to have a meeting of those interested during the forthcoming Madison Square Garden show, naming January 15 as the date for a conference of those who might be interested in his proposal, which includes a competition for a gold cup.

It is Mr. Dupuy's idea that only fifty cars should participate and each maker limited to five cars. Probably there would be 300 persons on the tour and the entry fee for each passenger would be $1,000, which sum is to cover the entire expense per person from the moment of taking steamer from this side. A delightful itinerary has been planned, to include the next Grand Prix in France, and the months of June and July would be the time for the tour. Such experienced autoists as W. K. Vanderbilt, Jr., Jefferson deMont Thompson, E. R. Thomas and others equally prominent have been interviewed on the tour, have expressed themselves as confident of its success.

JERSEY REGISTRATION FALLS BEHIND.

While the supporters of the Frelinghuysen law proudly point to the fact that the receipts from licenses and fines, for the six months that the measure has been effective, have amounted to $62,000, whereas an income of but $50,000 per annum was predicted for it, and that there are now 14,000 automobiles licensed in the State, the fact that the latter figure does not represent the natural growth that would have taken place under less adverse legislation is not taken into account. During the same period there has been an actual increase of something like 5,000 in the number of New York licenses, and other States have shown a proportionate growth. Hundreds of autoists who formerly held licenses refuse to pay the tax as a matter of principle.

WORCESTER'S CLUB IS BUSY THESE DAYS.

WORCESTER, MASS., Dec. 24.—At the monthly meeting of the Worcester Automobile Club ten new members were admitted, and Secretary F. E. Frost says that the total is now 470. A dance will be held at the club quarters in January. December 31, Elsie Janis, the little star of "The Vanderbilt Cup," will appear at a local theater, and the club has taken 200 seats for the performance. After the play Miss Janis will be given a reception and special dinner at the club quarters.

DEMOGEOT AND GUINESS AT ORMOND.

It is now definitely announced that Demogeot will again try for laurels at the wheel of a Darracq on the Florida beach. His car will be the 4-cylinder, 100-horsepower machine which Wagner drove to victory in the Vanderbilt Cup Race. The 8-cylinder, 200-horsepower car that earned Demogeot the title of "Speed King" last year, was sold to A. Lee Guiness, the young English amateur, who will bring it over with him to compete in the Florida races also.

A. L. A. M. FOSTERS INTEREST IN RACING.

Despite the proximity of show time, when all other demands on the makers' attention must give precedence to the all-important one of getting the exhibits ready, the Mechanical Branch of the Association of Licensed Automobile Manufacturers has considered the time opportune to recommend that the older and larger makers take up the task of building racing cars for 1907.

QUAKER CITY'S CRAMPED SHOW PLACE.

PHILADELPHIA, Dec. 24.—It was only after thoroughly ransacking the city for a suitable show hall that the committee in charge of the next exhibition of the Philadelphia Automobile Trade Association was compelled to accept that old stand-by, the First Regiment Armory. The committee, however, is going to make a success of the show just the same, and has conjured up a plan whereby "Gasoline Row," of which the armory bounds the north end, will be decorated with flags and electric lights as a sort of free annex, all the prominent agencies and branch houses having agreed to help the game along by keeping open till 11 o'clock at night during the week. In this way only can the big fellows hope to supplement the miserably small opportunities for a fair exhibit in the show proper.

The annual election of the Trade Association last week resulted in the choice of W. F. Smith (Rambler), president; H. Bartol Brazier (Marmon), vice-president; George Thompson (Stevens-Duryea and Lozier), secretary-treasurer, the board being completed by the election of E. C. Leeds (Studebaker and Matheson), and F. C. Van Derhoof (Ford).

A MINNEAPOLIS SHOW OF REAL WORTH.

MINNEAPOLIS, MINN., Dec. 24.—The first tire and tire accessory show to be held in the Northwest has been arranged by the Minneapolis Automobile Club, for January 3, 4 and 5. The exhibition will fill the big billiard room in the club's quarters in the Plaza, and seven tire companies have taken space: Diamond, represented by W. E. Roby; Morgan & Wright, C. E. Marshall; Fisk, Frank Smith; G & J, Plant Brothers; International, J. N. Johnson; Goodrich, W. A. Owens; Hartford, Frank Kerner.

In addition, the J. N. Johnson Company and O. Fenstermacher will operate complete tire repair plants, with expert demonstrators; the Auto Construction Company will demonstrate an electric vulcanizer; L. H. Fawkes will exhibit an anti-skid casing, and N. B. Garslin & Co. a steel casing, both local products, and other accessories will be shown.

BALTIMORE'S SHOW IN LYRIC HALL.

BALTIMORE, Dec. 24.—The arrangements for the second annual show have been completed, and will be held during the week of January 21, under the auspices of the Automobile Club of Maryland and the local dealers. Because of the difficulty and disorder attending the holding of the show in the garage of the Motor Car Company, as was done last year, the Lyric has been selected, which is one of the largest halls in the city. Last season the show outgrew the most sanguine hopes of the promoters, and B. R. Johnson firmly established his reputation as a manager.

OMAHA'S SHOW TO BE HELD MARCH 13-16.

OMAHA, NEB., Dec. 24.—The second annual automobile show at Omaha will be held March 13 to 16, four days. The five local dealers, J. Clarke Coit, H. E. Frederickson, R. R. Kimball, J. J. Deright, and Clarke Powell have leased the Auditorium, and will take all the space for their own exhibits and those of the factories which they represent. The factory men will come here from Kansas City, where a show will be held the previous week. The first show was held at Omaha last winter, and it proved such a success that the dealers decided to make it an annual event.

ANOTHER LONG DISTANCE TOUR FOR 1907.

After having threshed out the matter over a period of several months, the Contest Committee of the National Association of Automobile Manufacturers announces that it has achieved the hitherto impossible—the formulation of a plan for a long touring contest on a basis that could be considered equitable to all sorts of cars. Most of the rules comprising it have been framed, though no definite announcement will be made until the annual meeting of the N. A. A. M., to be held in New York during the week of the Madison Square Garden show.

TRADE DOINGS WAY DOWN EAST.

PORTLAND, ME., Dec. 24.—Automobilists of Portland and Maine in general are already beginning to discuss the second annual automobile show which will be held in the big Portland Auditorium Februrary 25 to March 2. Every effort is being made to attract interest not only throughout the State but all over New England. The first annual show, held last Spring, was more of a feeler by the automobile dealers.

The Spring of 1907 will see a number of changes in the agencies in Portland. H. J. Willard is the only dealer who will have exactly the same cars as last year. His will be the Cadillac, Buick, Elmore, Packard, Peerless, Winton, and Franklin. The F. O. Bailey Company has given up the Rambler and the handling of automobiles. The Allen Motor Company, instead of having the Reo and the Stoddard-Dayton, will boom the Cameron. The Chenery Manufacturing Company, which has had the Pope-Hartford and the Pope-Tribune, will not again handle automobiles.

J. A. Dowling & Co., instead of the Pierce, Columbia, Fiat, and Studebaker, will this year have the Thomas and the Royal Tourist. Mr. Dowling will not be the active manager of this garage this year. The position of manager and salesman will be held by Albert M. Spear, Jr., formerly of the Maine Motor Carriage Company. Mr. Spear was the first automobile agent in Maine, and has a wide clientage among the Pine Tree State residents.

The L. C. Gilson Company will next year have the Reo and Ford. Herbert A. Harmon will again have the White, and the Eastern Motor Company the Wayne.

The Maine Motor Carriage Company, instead of having the Thomas, Stevens-Duryea, and Oldsmobile, will in 1907 have the Stevens, as before, the Haynes, both types of Pope-Hartford, and the Pope-Tribune. George A. Way, of the F. O. Bailey Company, is the successor to Mr. Spear at this garage.

F. W. Smith will probably be the agent for the Jackson in 1907. F. A. Nickerson will have an agency for the exclusive handling of the Great Pierce Arrow.

ART FOR THE GARDEN SHOW.

Even a partial investigation of the preparatory work being done in order to decorate Madison Square Garden for the seventh national automobile show, of January 12-19, is astounding. It seems almost as if S. R. Ball, the decorator-general, is proceeding with the idea of creating some permanent hall of art. At the modeling works, two entire floors are given over to getting ready the two dozen or more heroic statues of different designs, the great fountain, and other objects that will adorn the Swiss garden, into which the interior of the show building is to be transformed. In a vacant store, downtown in New York, a gang of art-carpenters are busy converting several carloads of white birch boughs and trunks into rustic arbors and bowers, while in a spacious loft across town a score of girls are busy sewing 37,000 silver stars into the fifteen thousand yards of stuff that will form the amber-hued sky.

The accompanying picture is one view of the modeling room at the plaster moulders. The size of the statues may be judged by comparing the height of the workmen to them. The whole decorative scheme is one which is collectively an embodiment of the highest type of the art beautiful.

DREW HONORS FOR THE COLUMBIA.

W. W. Burke, manager of the New York Branch of the Electric Vehicle Company, of Hartford, was the lucky winner of the privilege of exhibiting a car at the Hotel Breslin during the Garden show week. Representatives of the whole vehicle makers who will exhibit at the show were entertained the other day at luncheon by Manager G. F. Stockham, of the Hotel Breslin, and afterward the drawing took place. These drawings for the two shows have come to be annual events, and always arouse keen interest on the part of the exhibitors. Mr. Burke will select a 1907 Columbia model for the Breslin rotunda, and will stage it in an attractive manner.

HOW THE WORK IS PROGRESSING ON THE ELABORATE DECORATIONS FOR THE FORTHCOMING SHOW IN MADISON SQUARE GARDEN.

LIST OF EXHIBITORS FOR THE GARDEN

TWO hundred and seventy-one exhibitors are contained in the official list for the Madison Square Garden show of the Association of Licensed Automobile Manufacturers, the dates for which are January 12 to 19. Herewith are the concerns which will hold forth in the seventh Garden show:

1. Royal Motor Car Co.
2. Northern Motor Car Co.
3. Smith & Mabley Inc.
4. Haynes Auto Co.
5. Cadillac Motor Car Co.
6. Buick Motor Car Co.
7. Elmore Mfg. Co.
8. Olds Motor Works.
9. De Dietrich Import Co.
10. Darracq Motor Car Co.
11. Archer & Co.
12. Auto Import Co.
13. Sidney B. Bowman Auto Co.
14. Wyckoff, Church & Partridge.
15. Smith & Mabley, Inc.
16. Hol-Tan Co.
17. Winton Motor Carriage Co.
18. Packard Motor Car Co.
19. E. R. Thomas Motor Co.
20. Electric Vehicle Co.
21. Stevens-Duryea Co.
22. H. H. Franklin Mfg. Co.
23. Peerless Motor Car Co.
24. Autocar Co.
25. Pope Mfg. Co.
26. Pope Motor Car Co.
27. Locomobile Co. of America.
28. The Geo. N. Pierce Co.
29. Knox Auto Co.
30. Lozier Motor Co. of New York.
31. Studebaker Auto Co.
32. Walter Auto Co.
33. Hewitt Motor Co.
34. Waltham Mfg. Co.
35. Apperson Bros. Auto Co.
36. F. B. Stearns Co.
37. Matheson Motor Car Co.
38. Columbus Buggy Co.
39. Corbin Motor Vehicle Corp.
40. Studebaker Auto Co.
41. Babcock Electric Carriage Co.
42. Pope Motor Car Co.
43. Electric Vehicle Co.
44. Cantono Electric Forecarriage.
45. Baker Motor Vehicle Co.
46. Diamond Rubber Co.
47. Pittsfield Spark Coil Co.
48. Goodyear Tire & Rubber Co.
49. C. F. Splitdorf.
50. Dayton Electrical Mfg. Co.
51. G & J Tire Co.
52. Gray & Davis.
53. Veeder Mfg. Co.
54. Manufacturers' Foundry Co.
55. Whitney Mfg. Co.
56. Brown-Lipe Gear Co.
57. Byrne Kingston & Co.
58. Autocoil Co.
59. N. Y. & N. J. Lubricant Co.
60. Baldwin Chain Mfg. Co.
61. Remy Electric Co.
62. Utility Co.
63. Motsinger Device Mfg. Co.
64. Steel Ball Co.
65. National Carbon Co.
66. The Webb Mfg. Co.
67. Briscoe Mfg. Co.
68. Morgan & Wright.
69. Kilgore Auto Air Cushion Co.
70. Republic Rubber Co.
71. Cooks Railway Appliance Co.
72. Winchester Speedometer Co.
73. Holley Bros. Co.
75. Firestone Tire & Rubber Co.
76. Phineas Jones & Co.
77. Hartford Suspension Co.
78. Shelby Steel Tube Co
79. Swinehart Clincher Tire & Rubber Co.
80. Warner Instrument Co.
81. Timken Roller Bearing Axle Co.
82. Warner Gear Co.
83. Consolidated Rubber Tire Co.
84. Jones Speedometer.
85. Pennsylvania Rubber Co.
86. R. E. Dietz Co.
87. Standard Welding Co.
88. American Ball Bearing Co.
89. International Rubber Co.
90. Badger Brass Mfg. Co.
91. Fisk Rubber Co.
92. Hyatt Roller Bearing Co.
93. Whitlock Coil Pipe Co.
94. Rose Mfg. Co.
95. Midgley Mfg. Co.
96. Hartford Rubber Works Co.
97. B. F. Goodrich Co.
98. Post & Lester Co.
100. Stevens & Co.
101. Charles E. Miller.
103. Hartford Auto. Parts Co.
104. Oliver Instrument Co.
105. Uncas Specialty Co.
106. Dixon Crucible Co.
107. Valentine & Co.
108. Vestal Shock Absorber Co.
109. Muncie Auto. Parts Co.
110. Eastern Carbon Works.
111. Bethlehem Steel Co.
112. Wm. Cramp & Sons Ship & Eng. Bldg. Co.
113. American & British Mfg. Co.
114. Schwarz Wheel Co.
115. Carpenter Steel Co.
116. J. H. Sager Co.
117. O. W. Young.
118. Avery Portable Light Co.
119. Springfield Metal Body Co.
120. Oliver Mfg. Co.
121. Thos. Prosser & Son.
122. English & Mersick Co.
124. Rushmore Dynamo Works.
126. Duplex Ignition Co.
127. Light Mfg. & Fdry. Co.
128. A. R. Mosler.
129. Lipman Mfg. Co.
130. Vacuum Oil Co.
131. W. C. Robinson & Son Co.
132. Diezemann Shock Absorber Co.
133. A. W. Harris Oil Co.
134. R. H. Smith Mfg. Co.
135. Spicer Univ. Joint Mfg. Co.
136. The Chandler Co.
137. Gilbert Mfg. Co.
138. Motor Car Specialty Co.
139. Gray-Hawley Mfg. Co.
140. Edmunds & Jones Mfg. Co.
141. Weed Chain Tire Grip Co.
142. Conn. Tel. & Elec. Co., Inc.
143. Stackpole Battery Co.
144. Witherbee Igniter Co.
145. Atwater-Kent Mfg. Works.
146. Noera Mfg. Co.
147. Acetyvone Co.
148. Globe Mach. & Stamping Co.
149. E. M. Benford.
150. Hopewell Bros.
151. Vesta Accumulator Co.
152. Voorhees Rubber Mfg. Co.
153. Way Muffler Co.
154. Sprague Umbrella Co.
155. Direct Drive Axle Co.
156. Detroit Motor Car Sup. Co.
157. Hess-Bright Mfg. Co.
158. American Elec. Novelty & Mfg. Co.
159. Rands Mfg. Co.
160. Wm. J. Duane & Co.
161. The Pantasote Leather Co.
162. Turner & Fish Co.
163. National Battery Co.
164. Brennan Motor Mfg. Co.
165. Ajax-Grieb Rubber Co.
166. S. F. Bowser & Co.
167. Diamond Chain & Mfg. Co.
168. C. T. Ham Mfg. Co.
169. Detroit Lubricator Co.
170. Gemmer Engine Co.
171. Wray Pump & Register Co.
172. Aurora Automatic Machinery Co.
173. Gabriel Horn Mfg. Co.
174. Herz & Co.
175. Heinze Electric Co.
176. Hoffecker Speed and Mile Register Co.
177. F. H. Wheeler.
178. Pope Motor Car Co.
179. Knox Auto Co.
180. H. H. Franklin Mfg. Co.
181. General Electric Co.
181a. Blue Ribbon Horse & Carriage Co.
181b. Garvin Machine Co.
182. J. M. Quinby & Co.
182a. Michael Ehret.
183. Hewitt Motor Co.
184. Studebaker Auto Co.
185. General Vehicle Co.
186. Thos. D. Buick Co.
186a. P. Reilly & Son.
187. Electric Rubber Mfg. Co.
188. Manhattan Storage Co.
189. Franco-American Auto & Supply Co.
190. Albert Champion Co.
191. Aster Co.
192. Motor Car Equipment Co.
193. Leon Rubay.
194. E. F. Hodgson.
195. Kitsee Storage Battery Co.
196. Motor.
196a. Autmo Cabinet Co
197. Sibley & Pitman.
198. Motz Clincher Tire & Rubber Co.
199. Trident Tire Co.
200. E. J. Willis Co.
201. Patterson, Gottfried & Hunter.
202. N. Y. Sporting Goods Co.
203. R. & P. Traction Tread Tire & Tube Co.
204. Hill Mfg. Co.
205. Metal Stamping Co.
206. M. E. Schoening.
207. Graham & Goodman, Inc.
208. Class Journal Co.
209. Manhattan Auto Top Co.
210. Standard Brake Co.
211. John T. Stanley.
212. Lavalette & Co.
213. Dow Tire Co.
214. Robert Bosch, N. Y., Inc.
215. National Sales Corporation.
216. Samson Leather Tire Co.
217. S. Smith & Son, Ltd.
218. Vehicle Apron & Hood Co.
219. Hewitt Motor Co.
220. Mutual Auto Accessories Co.
221. Duff Mfg. Co.
222. Trade Adertising Pub. Co.
223. Auto Accessories Mfg. Co.
224. National Oil Pump & Tank Co.
225. Brooklyn Motor Supply Co.
226. Gould Storage Battery Co.
227. E. P. Ingersoll.
228. Julius King Optical Co.
229. Harburg Tire Co.
230. Heath Dry Gas Co.
231. Springfield Portable Construction Co.
232. Continental Caoutchouc Co.
233. Havemeyer Oil Co.
234. C. Cowles & Co.
235. C. A. Shaler Co.
236. Watres Mfg. Co.
237. Syracuse & Elbridge Glove & Mitten Co.
238. The Auto Supply Co.
239. Manhattan Lamp Works.
241. Adam Cook's Sons.
243. Cleveland Cap Screw Co.
244. Peter A. Frasse & Co.
245. Allen Auto Specialty Co.
246. Harry A. Allers & Co.
247. J. S. Bretz Co.
248. Electric Storage Battery Co.
249. E. T. Kimball Co.
250. P. M. Hotchkin.
251. Morrison, McIntosh & Co.
252. Leather Tire Goods Co.
253. Harrington Lubricant Co.
254. George Loring Co.
254a. Punctureproof Tire Co.
256. Tire Safety Device Co.
257. T. Alton Bemus Co., Inc.
258. C. F. Ernst's Sons.
259. Stall & Dean Mfg. Co.
260. Portable Electric Safety Light Co.
261. Energine Refining Co.
262. Semi-dry Battery Co.
263. Standard Metal Work Co.
264. National Novelty Co.
265. The A-Z Co.

OLD SAINT NICK A SCORCHER.

DETROIT, Dec. 24.—Last week, while the Christmas shoppers swarmed the streets and stores like bees and the holiday spirit filled the air everywhere, the weather man was kind and sent a heavy fall of moist snow that made the streets look like a beautiful fairyland. It was all too nice for Santa Claus to stay away. He could not resist making his annual appearance, even if it was several days before the appointed time. Knowing that Detroit is the greatest automobiling center in America and that there are gasoline vehicles by the hundreds upon the streets, the old fellow decided that it would be rather risky to take his time-honored steeds to that city, as they might become frightened, run, smash the sleigh and spill the toys. He evidently decided that "When in Rome, do as the Romans do" is best, so secured an Aerocar and went spinning up Woodward avenue, tooting the horn as though he owned the street. Of course Nick attracted much attention.

Young and old alike paused in their jostling hurry and watched the jolly old Saint as he opened the throttle still wider and made the snow roll up behind the wheels.

SAINT NICK'S UP-TO-DATE APPEARANCE IN DETROIT.

THE TANGEMANS IN THEIR FIAT AT BADEN BADEN.
This photograph was taken during the summer European tour of Mr. and Mrs. George P. Tangeman, who are seated in the tonneau of their 35-h.p. Fiat. S. H. Morehead is in the front seat.

MATHESON COMPLETES STRENUOUS JOURNEY.

After a strenuous winter trip of a week, R. G. Kelsey and Frank Lescault arrived in Chicago in the Matheson runabout in which they left New York early the previous Sunday morning. Both men were nearly frozen, but were thoroughly satisfied with the work of the car, which went through the awful pounding over roads that were in some cases almost impassable, without serious difficulty of any kind—in fact, the worst trouble encountered came in the form of two punctures, the wrapped tread Diamonds, with flat treads, holding up well throughout the trip. Mr. Kelsey wins a wager that the trip could be made within a week.

NO EXCLUSIVE RUSHMORE AGENCY.

Editor THE AUTOMOBILE:

We have been greatly annoyed since the late show by reports circulated among the trade to the effect that we have given the exclusive agency for the sale of the Rushmore searchlight equipment throughout the country to E. J. Willis & Co., and other reports that we have given that firm the exclusive agency for New York.

Several dealers, on hearing these reports, are said to have placed their orders elsewhere, believing that they could no longer deal with us direct. We wish to say that the above reports are absolutely false, and without the slightest foundation in fact. We shall continue to manage our own affairs, as we have managed for the past fifteen years, without interference or dictation from any dealer or any accessory or other association. Will you kindly publish this statement for the information of the trade?

RUSHMORE DYNAMO WORKS,
Plainfield, N. J. A. W. Rushmore.

LILLIAN RUSSELL ABOUT TO ENTER HER MAXWELL LANDAULET.

NEWS OF THE GARAGES.

New York Branch of the White Company Expands.

The White Company has rented the four-story and basement building on the southwest corner of Broadway and Sixty-second street for use as a salesroom and executive offices of the New York branch, this location being within 50 feet of the present salesroom at 42 West Sixty-second street. Possession of the new quarters will be taken January 1, when the building will be entirely renovated, re-decorated and furnished in a style befitting the standing of the concern. The building has 52 feet frontage on Broadway and runs back 64 feet on Sixty-second street, giving a total floor space for the entire structure of 16,500 square feet. The first floor is to be used as a salesroom, the second floor for executive offices and for the sale of second-hand cars, while the two upper floors and the basement will be used for the storage of whatever overflow there may be from the mammoth White garage on West End avenue, the latter being the largest in the world devoted to a single make of car.

Palatial Garage for Philadelphians on North Broad Street.

The Keystone Motor Car Company, of Philadelphia, is having plans prepared for a large garage at 216-220 North Broad street, to be four stories high, built of steel and concrete with stone and terra cotta front. The building will be 53 x 200 feet and will be very handsomely finished interiorly. Reception and waiting-rooms will be provided for patrons of the garage, while billiard, locker and sitting-rooms will be furnished for chauffeurs. The building will accommodate more cars than any garage in the vicinity of Philadelphia.

Pierce-Arrow Will Have New Quarters in New York.

A large garage and salesrooms to be built on Fifty-fourth street, 100 feet west of Broadway, will be occupied by the Harrolds Motor Car Company, New York selling agents for the Pierce-Arrow. The building will be a near neighbor to the new clubhouse of the Automobile Club of America.

Newark Will Have New Garage of Fifty-Car Capacity.

The Newark Motor Car Company, of Newark, N. J., is erecting a large garage on Fourteenth street near Central avenue. The building will be 50 x 90 feet and the roof will be supported by trussed girders so as to leave the floor entirely clear. About fifty cars will be accommodated.

GARAGE ITEMS IN GENERAL.

The Auto Selling and Repair Company, a Minneapolis, Minn., retail and repair house, is constructing a two-story garage on Tenth street.

Eno & Varner, of Los Angeles, Cal., will erect a large building on American avenue and Third street, the lower floor of which will be used for a garage and repair shop.

Borgers Brothers, of Madison, Wis., recently appointed agents for the Ford and Reo cars, will erect a three-story garage building on Johnson and Warren streets to accommodate their rapidly increasing automobile business.

NORTHERN'S PORT HURON PLANT BEGUN.

PORT HURON, MICH., Dec. 24.—Work has been started on the new plant of the Northern Motor Car Company. Three large buildings of brick, concrete, and glass will be erected on a ten-acre site adjoining a half-mile race track to be used for testing cars. Local people subscribed for $100,000 worth of stock and presented the site and the buildings to the company, which will manufacture its four-cylinder cars at its Detroit plant and the two-cylinder cars in the factory here. The contract calls for the completion of the plant within sixty days.

BLAZING THE WAY TO FLORIDA'S RACE COURSE

AT 11 o'clock Sunday morning Ralph R. Owen, of Cleveland, O., accompanied by Andy Aubel, of Akron, O., and photographer Corneille, started from New York City on a trip to the Ormond-Daytona Beach, Florida. The car is a 35-40-horsepower Oldsmobile of stock design. With every expectation of a really tough trip, Mr. Owen had provided himself with block and tackle, planks, shovel and pick, and other appliances to enable himself to escape possible trouble en route.

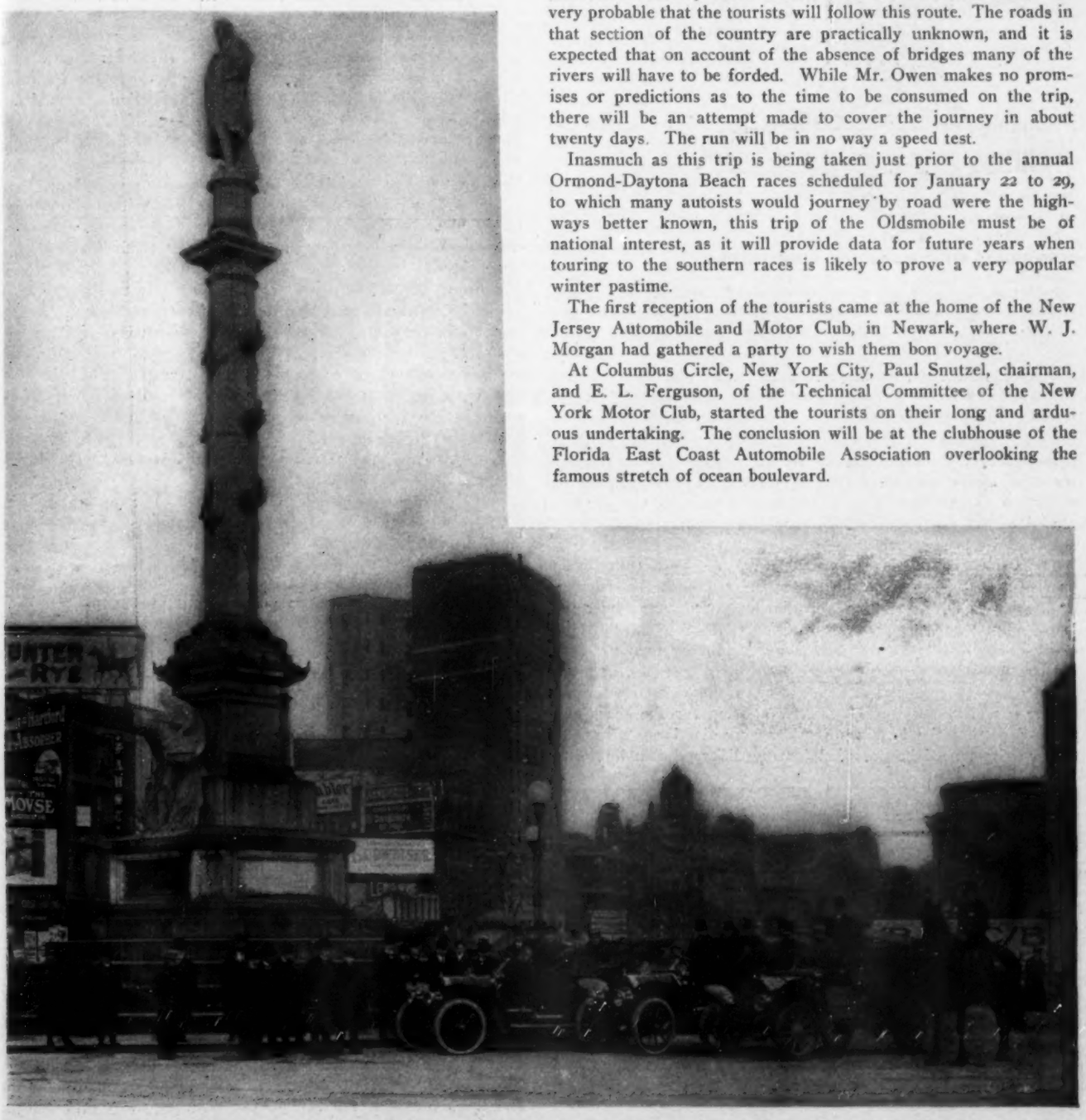
Although not definitely decided upon beyond Staunton, Va., the route out of New York was by way of Newark, to Philadelphia, Reading Harrisburg, Gettysburg, and Hagerstown. From this point the recent course laid out by Augustus Post will be followed down the Shenandoah Valley as far as Staunton. Beyond this city the tourists will have their choice of three routes, the most eastern running along the coast passing through Richmond, Smithfield, Florence, Savannah and Jacksonville. A middle route passes through the central part of North Carolina and Georgia by way of Charlotte, Columbia, Augusta, and Savannah. The third and more western route passes beyond the mountains through the State of Tennessee and the western part of Georgia, touching Knoxville, Rome, Atlanta, Macon, Tipton, Jasper, Lake City, and thence to Jacksonville.

According to current reports, the middle course will be found in the best condition at this time of the year, and owing to the fact that it is very much shorter than the western course, it is very probable that the tourists will follow this route. The roads in that section of the country are practically unknown, and it is expected that on account of the absence of bridges many of the rivers will have to be forded. While Mr. Owen makes no promises or predictions as to the time to be consumed on the trip, there will be an attempt made to cover the journey in about twenty days. The run will be in no way a speed test.

Inasmuch as this trip is being taken just prior to the annual Ormond-Daytona Beach races scheduled for January 22 to 29, to which many autoists would journey by road were the highways better known, this trip of the Oldsmobile must be of national interest, as it will provide data for future years when touring to the southern races is likely to prove a very popular winter pastime.

The first reception of the tourists came at the home of the New Jersey Automobile and Motor Club, in Newark, where W. J. Morgan had gathered a party to wish them bon voyage.

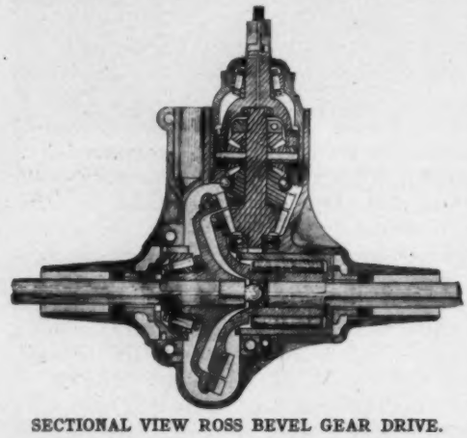
At Columbus Circle, New York City, Paul Snutzel, chairman, and E. L. Ferguson, of the Technical Committee of the New York Motor Club, started the tourists on their long and arduous undertaking. The conclusion will be at the clubhouse of the Florida East Coast Automobile Association overlooking the famous stretch of ocean boulevard.



FROM COLUMBUS CIRCLE, IN THE SHADOW OF THE GREAT DISCOVERER'S STATUE, THE OLDSMOBILE PATHFINDER MADE ITS START

IMPROVED FORM OF STEERING GEAR.

In order to overcome the defects inherent in the average type of steering gear, the Ross Gear and Tool Company, Lafayette, Ind., are placing an improved form on the market that has been designed solely with a view to providing a device that will withstand long service without getting out of adjustment, as well as one having an absolute backlock. Instead of points of contact, surfaces of ample bearing length are presented to one another to minimize wear, and the device is encased in a dust-proof and oil-tight housing. Its construction is tubular, not exceeding three inches in diameter in the largest size, which makes it readily adaptable to any machine, and particularly those where the location of the steering gear is a complicated problem due to lack of room. As the device complete is in the form of a continuous tube from the steering wheel to the steering rod connection, it permits of an ideal arrangement for cars having long four or six cylinder motors. When given considerable rake, as on a high-powered, long wheelbase runabout, connection is made to the left steering knuckle, and, when placed more nearly vertical, to the right-hand knuckle. The back locking effect is obtained on the lock nut principle wherein the latter is given a finer pitch than the nut to be locked. On the same plan, the hollow shaft operated by the steering wheel is given an external thread on its outer end, so cut as to produce a maximum longitudinal movement from a rotary source. This external thread engages an internally threaded sleeve, and the latter is in turn cut with a spiral or worm on its exterior. The rotary motion thus set up is transmitted to the steering knuckle through an arm attached to the sleeve and a connecting rod.



SECTIONAL VIEW ROSS BEVEL GEAR DRIVE.

The same manufacturers are also putting a rear live axle on the market that permits of giving the rear wheels a camber, and which at the same time embodies an improvement over the usual form of bevel drive and differential. By splitting the bevel pinion into two parts and compensating between the two, the compensation is placed on the high speed member, and can be decreased in size and weight in proportion to the speed ratio. This removal allows a much smaller housing for the gears and permits putting the bearings much nearer the large gears, so that no room need be provided for the differential in line with the axle. Therefore the leverage from the large split rings is reduced to a minimum. This removal of the differential makes it much more accessible, as it can readily be removed from the front of the housing. The differential receives none of the end thrust due to side motion of the car. Also, if the axle becomes distorted from overload or jar, and the tops of the drive wheels are brought closer permanently, the differential does not bind on top, nor does it have too great clearance below.

VIEW OF ROSS STEERING GEAR READY FOR SERVICE.

ROSS STEERING GEAR DISMOUNTED SHOWING PARTS.

The efficiency of transmission is increased, as the whole tooth face seldom breaks contact at the same time, due to the ever-changing position of one drive with respect to the other. This same feature reduces the noise materially. As the driving pinion and the driven gears are each split into two parts, it no longer becomes necessary for the driven gears to have a common center line of shafts. For so long as the driving and driven shafts remain at an angle of ninety degrees to each other and the gears retain the common cone center, the two halves of the driven gears may each have center lines of shafts in different planes by cutting the outer gear to allow for a limited deflection of the inner gear.

With this last feature it becomes possible to raise the center of the axle above the outer ends, thus securing the truss construction without the use of any universal joint or intermediate means. The rear axle may be cambered to the same degree as the front axle, making the whole machine look balanced throughout, and at the same time acquiring all the advantages of road clearance and strength. The wheels are under the load and drawing to the load. This adds to the lightness, strength and simplicity of design.

TO ASSIST PATRONS IN EUROPEAN TOURS.

"During the past five or six years we have been called upon so frequently to aid tourists in procuring cars for use on the other side, and the demand of late has become so great, that we have decided to make a service of this kind a branch of our business," said Carleton R. Mabley, of Smith & Mabley, Inc. "We have established a bureau in Paris which will furnish touring routes, hotel lists and cars of any size desired, together with a reliable chauffeur capable of acting in the capacity of a courier as well. The cars will be maintained in good running order, and the only extra expense beside the regular rental charge will be for oil, gasoline and tires. When arranged for in advance, through either the home or the Paris office, the car will meet the customer at any British or Continental port of the transatlantic liners. We will provide only new cars of large horsepower and fine equipment such as have not been obtainable for rental before. In Germany and Italy it is practically impossible to rent a good automobile, while in France it is not always easy to obtain a desirable car. The rental will be the same as regularly charged in France and England, and if the tourist desires to purchase the car, 80 per cent. of the rental will be applied to the purchase price."

NEWS AND TRADE MISCELLANY.

The Gibson-Short Cycle and Automobile Company, of Indianapolis, Ind., has changed its name to the Gibson Automobile Company.

Ralph Temple, of Chicago, recently sold a bunch of twenty Jackson cars to the Iowa Automobile and Supply Company, of Des Moines.

The Autocoil Company of Jersey City, N. J., has secured the entire ignition contract of the Autocar Company of Ardmore, Pa., for the coming season.

The National and Commercial Manufacturing Company, of Hammond, Ind., is planning to build a very extensive plant for the manufacture of automobiles.

The Mason Motor Car Company, of Kansas City, has sold its entire output for 1907, to E. L. DeKamp, of the same place, at a total price of more than $200,000. The factory force has been greatly increased to get out the cars on time. About 200 machines will be built.

The lounging room for chauffeurs in the garage of C. A. Coey & Co., of Chicago, is very popular among the chauffeurs, and deservedly so, for there are magazines, technical and popular, technical books for reference, a pool table, bootblack stand and games, and when a chauffeur is wanted, he is notified by an electric signal.

At the annual meeting of the Utica Motor Car Company, of Utica, N. Y., F. P. Miller, E. J. Otis, A. B. Maynard, G. H. Norris, H. H. Mundy, T. H. Ferris and C. H. Norris were elected directors. Mr. Miller was elected president, Mr. Otis vice-president, Mr. Mundy secretary, C. H. Norris treasurer and Mr. Maynard general manager.

Try-out runs of Columbia gasoline cars take the testers out into all kinds of weather, for the elements are not allowed to interfere with tests. Therefore the drivers are so protected against cold that they care little whether the thermometer is dallying around the zero mark or is trying to pry the top off the tube. And it seems to make no difference to the cars, either.

In the illustrated section of THE AUTOMOBILE for December 6, the Stoddard-Dayton limousine was erroneously rated at 18 horsepower — it should have read 30-35-horsepower. The factory representatives who were in attendance at the Grand Central Palace show, were C. G. Stoddard, general manager; H. J. Edwards, mechanical engineer, and R. Harry Croninger, sales manager.

The Dart Manufacturing Company has added an extension, 50 by 100 feet to its establishment, and has installed the machine shop that was formerly located in Sheffield and Lincoln avenues, in the building 819-821 Larabee street, Chicago. The garage will be discontinued after the first of the year, and an automobile school will be run in connection with the manufacture of gasoline engines and the carrying on of all sorts of repair work. A large number of students is already in attendance at the school.

In order to promptly meet the demands of its customers for renewals and recharging, as well as for the sale of new tanks, the Prest-O-Lite Co. announces that its head eastern office has been established in New York, at 1904 Broadway, between 63d and 64th Streets, and its pumping station at Harrison, N. J., is also in operation. To supply the New England business, an office is maintained at 541 Tremont street, Boston, while for Canada, a pumping station is run in connection with the Commercial Acetylene Plant, the office being known as the Presto-O-Lite Co., of Canada, at 6 King street, West. On the Pacific Coast, an office and pumping station have been established at Point Richmond, Cal.—just across the bay from San Francisco. The Indianapolis factory and pumping plant at 24 South East street, in the latter city, will take care of all central trade. From 600 to 2,000 tanks are always on hand at each one of these stations, so that shipments can be made without delay.

NEW AGENCIES ESTABLISHED.

The Los Angeles agency for the American Mercedes has been secured by George R. Bentel, of 605 Laughlin Building.

The Pittsburg agency for Michelin tires has been secured by J. J. Graffin, of New York, who has already entered upon his duties as manager of the new agency.

N. Tip Slee, manager of the Auto Motor Company, of Baltimore, Md., has secured the agency for the Maxwell for that city for 1907.

Ware & Floren, Lakota, N. D., have established themselves in the automobile business in that city, and will handle as their leaders, the Reo and Premier lines for 1907.

The Knox Automobile Company, of Springfield, Mass., will hereafter be represented in Philadelphia, Pa., by a new company, the Knox Motor Car Company, located at Sixteenth and Wood streets. E. L. Thrasher will be general manager.

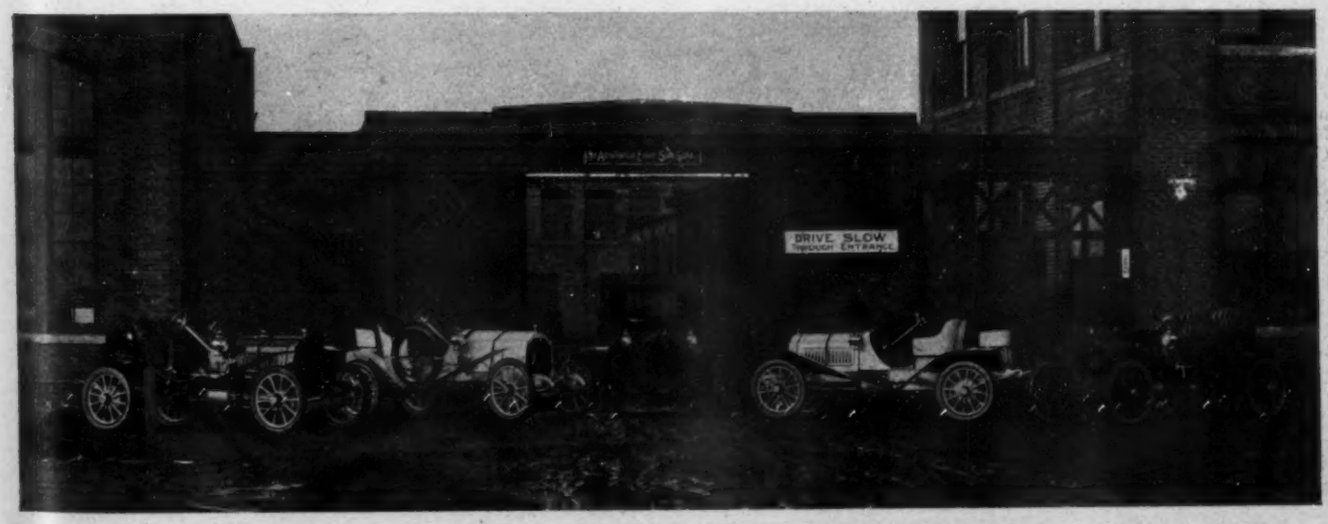
Agency changes in Minneapolis, Minn., include: Cadillac, from Jordan Auto Company to Northwestern Cadillac Company; Jackson, from Motor Car Company to Walter G. Benz. New agencies in Minneapolis are: Cartercar, W. A. Fox; Corbin, Jordan Auto Company.

The Harrison Wagon Company, of Grand Rapids, Mich., maker of the Harrison crankless car, has leased the large store in the north end of the Times Building, for its New York branch, formerly occupied by the Mercedes Import Company. The store faces Broadway, Seventh Avenue, and Times Square, and is one of the most prominent locations in the metropolis.

The Cadillac gasoline cars and the Waverley electrics, will be handled in Minneapolis, Minn., by the N. W. Cadillac Company, a new concern organized for the purpose. A spacious garage at 322 Fourth Avenue, South, has been remodeled for the company's work, and there will be done a general business in supplies and repairs, as well as sales of the cars named.

The Bartholomew Company, of Peoria, Ill., makers of the Glide announce the following additional new agencies for Glide cars for 1907: Spencer-Wilkie Motor Company, 316 Broad street, Philadelphia, exclusive agency for Eastern Pennsylvania and Southern New Jersey; Boulevard Garage Company, Cleveland, O., for Northern Ohio; W. B. Haines, Sunbury, Pa., Central Pennsylvania.

S. F. Bowser & Co., Inc., of Fort Wayne, Ind., have established a branch office at 229 Broadway, New York City, with W. T. Hatmaker in charge. Mr. Hatmaker was formerly manager of the mail order department of the company's Boston branch. The opening of the New York branch is only one of the many additions which the company has been compelled to make during the past year. The Fort Wayne factory has increased in size 125 per cent. and the general offices have been quadrupled. In addition to the above, the Bowser people



GROUP OF PACKARD "THIRTY" RUNABOUTS READY TO BE SHIPPED FROM THE FACTORY OF THE PACKARD MOTOR CAR COMPANY.

have built and just moved into a $25,000 factory at Toronto, Canada, and have added over 60 salesmen to the selling force.

The Logan Construction Company, of Chillicothe, O., placed the following agencies for 1907, at the recent Grand Central Palace show: E. P. Blake, Boston, New England States; J. M. Clark Company, Newport, R. I.; G. Bennett Smith, Freeport, L. I., for Long Island; E. P. Horton, White Plains, N. Y.; Harrisburg Automobile Company, Harrisburg, Pa.; Logan Motor Car Company, Greater New York; J. A. Kilpatrick, Lebanon, O.; A. C. Banker Company, Chicago; F. M. DeRivas, City of Mexico; Norman W. Church, Los Angeles, Cal., for the Pacific Coast; C. B. Corwin, export; G. B. Dickinson, Niantic and New London, Conn.; Samuel K. Landis, Lancaster, Pa.; D. B. Hoffer & Sons, Reading, Pa.; Guy J. Hartwell, Mobile, Ala.; W. J. Bishop, Augusta, Ga.

RECENT BUSINESS CHANGES.

The King Top Manufacturing Company, of Dayton, O., has succeeded to the business formerly conducted by the King Manufacturing and Garage Company, of that city. The new local address is 16 St. Clair street.

The Warren Axe & Tool Company, of Warren, Pa., manufacturers of axes and logging tools of all kinds, have recently acquired the patents and equipment of the American Drop Forging & Tool Company of Wayland, N. Y., having moved the plant to Warren, Pa. New and modern buildings have been constructed of concrete throughout, and as machinery of the latest improved type has been installed, they are now in a position to turn out the American pipe wrench and other patented specialties and drop forgings in a satisfactory manner.

PERSONAL TRADE MENTION.

George H. Strout, an old-time bicycle man, has been appointed sales manager of the Electric Vehicle Company, with headquarters at Hartford.

Paul L. Snutsel, president of the Snutsel Auto Supply Company, of New York, has returned from a trip to Europe, where he secured a number of novelties in the way of supplies and accessories.

R. L. Alcutt, recently of New York, will be the general manager of the Knox Automobile Company, of Illinois, which has been incorporated, and will handle Knox cars in the Chicago district, with headquarters at 1208 Michigan avenue.

Herman Raub, who was very much in the public eye last fall as king of the Coney Island Mardi Gras, has entered the automobile field, being interested, with John J. McCutchan, in the Empire State Automobile Garage at 2150 Broadway, New York.

Charles I. Critchett, of the Chicago Winton branch, died on December 15, after an illness of several weeks. Mr. Critchett was formerly secretary of the Chicago Cycling Club, and was well known among cyclists; he was the first Chicago representative of the Winton bicycle and sold the first Winton wheel ridden in that city. Mr. Critchett was 48 years of age.

M. Brasier and M. Perrenoud, respectively, business manager and chief engineer of the famous automobile manufacturing concern in France, will sail from France in time to attend the Madison Square Garden automobile show, and afterward will make an extended tour of the United States. M. Brasier states that his company is contemplating the construction of a racing car that will excel any machine now in existence. If these plans are carried out the car will compete in the next Vanderbilt Cup race.

Leon Rubay returned last Saturday on *La Provence*, from his annual visit to the Paris Salon. Mr. Rubay brought back with him a number of new things which he will introduce to the American market. While on the other side he obtained the exclusive agency for the Bleriot lamps and generators and the Titus portable socket wrench. Mr. Rubay also made arrangements to introduce to this market a complete motor and dynamo outfit for house lighting, having capacities from 1 to 130 horsepower. This lighting engine consists of a gas engine and a dynamo attached, and is built to be operated by inexperienced people. Mr. Rubay will also exhibit at his space in the coming show, the Argus headlight bracket, which turns in the same direction as the front wheels and enables the driver to see just where he is going. Another new thing which Mr. Rubay will show is the Lacoste high-tension magneto.

NEW TRADE PUBLICATIONS.

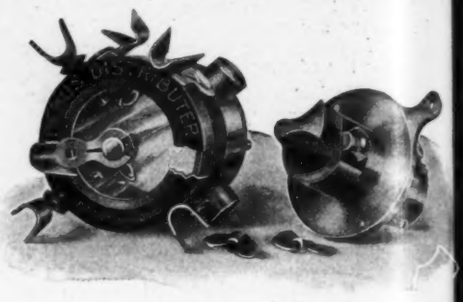
National Battery Company, Buffalo, N. Y.—Illustrated instruction book giving careful and minute directions for the care of National sparkers or ignition storage batteries. In addition to much practical and extremely useful information, the booklet gives the details and prices.

New Process Raw Hide Company, Syracuse, N. Y.—Illustrated catalogue and price list of rawhide gearing for all power transmission purposes where a noiseless gear is required. Much interesting information is given regarding these gears, which are made in all forms—spur, bevel, internal and so on.

Peerless Motor Car Company, Cleveland, O.—Illustrated catalogue of Peerless gasoline cars for 1907. This catalogue is an unusually fine example of press work, and of actual information about the cars and their component parts. The cars are described in detail, and the more important parts are illustrated by excellent halftones. Two chassis are made—30 horsepower and 45 horsepower—and either may be fitted with limousine, runabout, or touring body. The catalogue is refreshingly free from stilted claims and abounds in the kind of information desired by the man who is considering the purchase of a machine. Among the illustrations are a number showing the Peerless cars in the Glidden tour. And at the end of the book there is a place for a list of some of the records made by the good old *Green Dragon*, fitted with a Peerless motor of 60 horsepower.

BEMUS IGNITION TIMERS.

To the uninitiated, while it may seem to be a small thing, it is nevertheless a fact that a poorly-made or inaccurately-assembled timer or distributer will seriously affect the running of a motor, and many a first-class motor has given second-class results merely on account of slight defects in the apparatus for timing the vital spark. With a view to placing this part of the motor equipment beyond all doubt the T. Alton Bemus Company, of 133 Oliver street, Boston, Mass., has placed on the market a timer for use with multiple coils and a distributer for use with a single coil, made of the best materials and with the highest degree of accuracy. In the first place, accuracy in the spacing of the contacts is secured by laying out the intervals with an index head; this insures about as near an approach to absolute accuracy as can be attained. Then, in order to maintain the accuracy thus obtained, the contacts are made of extremely hard material, are so arranged that a new surface is presented at every contact, and finally, when, after long use, wear occurs, the contacts can be easily and accurately renewed at the cost of a few cents. The contacts are all made on hardened steel balls—a ball rotating in the central arm and a ball in each contact point in the casing; each ball is free to move in its socket and is held in position by a spiral spring. Every time the ball in the central arm makes contact with one of the others both balls turn in their sockets, rubbing in their sockets and keeping themselves bright and clean. The balls in the casing are set a little off center from the ball in the arm, so that the balls do not constantly turn on the same axis, but shift around and distribute the wear all over their surfaces. The bodies of the Bemus timers are of phosphor bronze, the bushings of hardened steel, the cover plate of fiber, and the balls standard sizes and easily obtained. The same principles of construction are employed in the distributer, though of course the instrument is of different construction. The same ball contact idea is carried out in the primary current part or contact maker, which forms the rear part of the distributer. The secondary current enters the instrument through the center of the glass front of the case, a spring-pressed ball serving as a contact with the revolving arm. From a flat brush swinging on the shaft end current is distributed to the various plug wires; there is no actual contact, however, there being a very minute space left over which the high-tension current jumps with the greatest ease, and this arrangement avoids wear and tear. The accompanying illustrations give a good idea of the construction of both timer and distributer.



ALTEMUS DISTRIBUTER FOR 1907.

ALTEMUS TIMER FOR 1907.

V.15

THE AUTOMOBILE

WEEKLY NEW YORK—THURSDAY, JULY 5, 1906—CHICAGO 10 CENTS

WINTON MODEL-K

Easily Learned

Fully ninety per cent. of Winton users drive their own cars, and do not require the services of a chauffeur.

That's because of the remarkable Winton Transmission and Air Control.

Each gear combination has its own clutch, which is engaged or disengaged at the same instant gears are changed. That simplifies operation wonderfully.

Still more remarkable is the fact that by the slightest pressure on a handy foot-button, the Winton driver may vary the speed of his car from four miles an hour up to its top limit without touching a lever or shifting a clutch. Winton operation and control are so easily mastered that the joy of motoring begins the minute one first takes hold of the steering wheel.

Just Compare the $2,500 Winton Model K with any Car on the Market Selling at $3,500 or More

"The Motor Car Dissected" tells the details. . Mention this paper and get a copy from

The WINTON MOTOR CARRIAGE CO.

Licensed under Selden Patent. Cleveland, O., U. S. A.

Winton Branch Houses in New York, Boston, Philadelphia, Chicago, Pittsburg and London.
Winton Sales Agencies in all important places.

THERE IS BEAU

FISK TIRES

Their many marked virtures need only a glance to be recognized.

THEY WILL BE CHEERFULLY DEMONSTRATED UPON APPLICATION BY ANY OF OUR REPRESENTATIVES.

FISK BRANCHES:

NEW YORK: 754 Seventh Ave.
SPRINGFIELD: 135 Bridge St.
MINNEAPOLIS: 704 Hennepin Ave.
SYRACUSE: 423 S. Clinton St.
CLEVELAND: 318 Euclid Ave.
DETROIT: 262 Jefferson Ave.
KANSAS CITY: 1330 Main St.
SAN FRANCISCO: 114 Second Ave.
BOSTON: 239 COLUMBUS Ave.
PHILADELPHIA: 138 N. Broad St.
ATLANTA: 103 N. Pryor St.
BUFFALO: 803 Main St.
LOS ANGELES: 1034 Main St.
CHICAGO: 1251 Michigan Ave.
ST. LOUIS: 3008 Olive St.

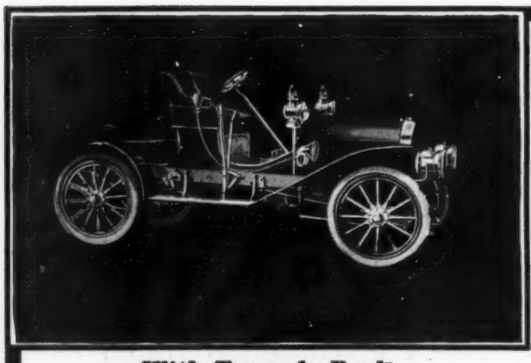
if you desire tires that will be easy on your car, comfortable and unannoying to you, besides absolutely safe,

SEE THAT YOUR EQUIPMENT IS "FISK."

Write us for a copy of "Tire Talk"

The Fisk Rubber Company

CHICOPEE FALLS, MASS.



With Torpedo Back

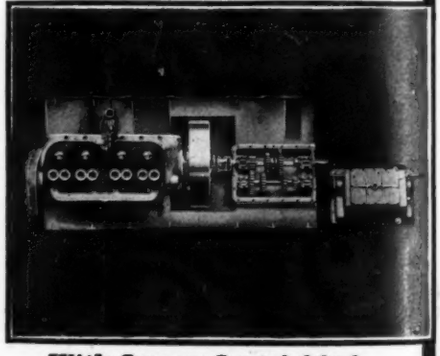
Mora Roadster

MECHANICALLY RIGHT.

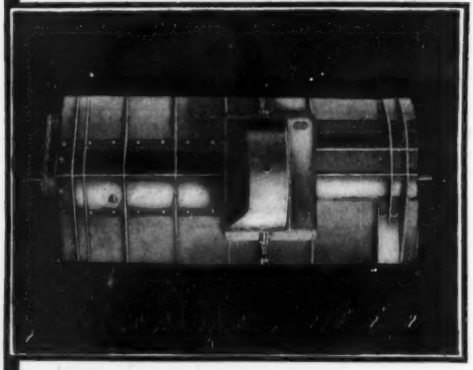
1907 Model B

Absolutely Mud-Proof

Only ordinary wear on mechanism makes our car last years longer than most others—look under any of them. This is because of an aluminum pan which prevents mud and dirt reaching any working part. A feature in motor car construction original enough for us to patent.



With Surrey Seat Added



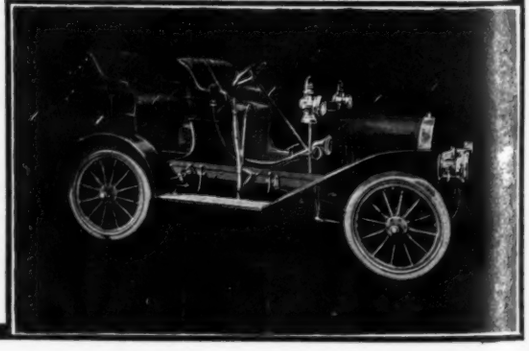
Marine Type Bearings

For years have proved their worth in marine engine practice; but their use in motor car construction is also original with us, we believe. These and the many other important points are worth investigating to prove that this

Ideal Gentleman's Roadster

reduces up-keep expenses to a minimum, and we invite you to write for our 1907 catalogue, to become thoroughly convinced.

SPECIFICATIONS—Four cylinder vertical Engine; 24 horse power; water cooled. 98-inch wheel base; 32-inch wheels. Weight 1700 lbs. Entirely mud proof. Price $1650. Surrey Seat $125 additional.



COMPLETE MOTOR CAR LAWS OF THE U. S. FREE

MORA MOTOR CAR CO.

318 Livingston Building

ROCHESTER, NEW YORK, U. S. A.

CORNELL UNIV. DEC 27 1906 LIBRARY

THE AUTOMOBILE

WEEKLY NEW YORK—THURSDAY, DECEMBER 27, 1906—CHICAGO 10 CENTS

"Firestone"

THE MAKERS OF THE TIRES OF STERLING QUALITY

Submit as complete a line of time-proven Motor Tires as was ever before offered to the Automobile Industry.

SOLID MOTOR TIRES.

Single Side-wire Motor Tire.

The Firestone Rubber Compound produces great resiliency and wear-resisting qualities; the side-wires compose the strongest retaining device in existence. This is the world's standard Motor Tire.

Dual Side-wire Motor Tire.

For rear wheels of heavy cars. Duplicates any width of single tire and is doing the heaviest work ever demanded of a tire.

This type has been in successful use for one year, and has recently been adopted by several of the largest truck makers as their regular equipment.

PNEUMATIC TIRES.

Cable Tire Type.

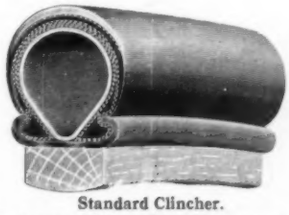
Clincher Tire Type.

SAFETY UNIVERSAL.

The rim for this tire is fitted either with flanges for a cable tire casing or flanges for a clincher tire casing. When cable tire flanges are used, the rim will receive the Firestone Mechanically Fastened Pneumatic Casing. Both casing and rim are interchangeable with other standard quick-detachable casings and rims. When clincher flanges are used, the rim will receive any standard clincher casing. Firestone Clincher Casings will fit any standard clincher rim. Flanges and tire are held in place by a simple and ingenious safety locking ring.

Mechanically Fastened.

A wrench is the only tool required in removing or replacing this tire.



Standard Clincher.

To meet the demands of users desiring Firestone quality, we are producing the standard clincher tire.

1907 Catalogs just issued. Which may we send and what is your address? The largest exclusive makers of Rubber Tires in the United States.

FIRESTONE TIRE & RUBBER CO., Akron, O.

BRANCHES: NEW YORK, Broadway & 58th St. PHILADELPHIA, 211 N. Broad St. ST. LOUIS, 2226 Olive St. BOSTON, 9 Park Sq.
CHICAGO, 1442 Michigan Avenue. DETROIT, 240 Jefferson Avenue. BUFFALO, Cor. Ellicott & Tupper Streets.

BOSTON, 494 Atlantic Avenue. HARTFORD, CONN. NEW YORK, 88 Chambers St., & 1769 Broadway.

CHICAGO, 83 Michigan Ave.

PHILADELPHIA, 138 North Tenth St.

NOT THE LOWEST IN PRICE BUT

HARTFORD DUNLOP TIRES

FOR QUALITY AND GOOD SERVICE

BUFFALO, 725 Main Street.

DETROIT, 256 Jefferson Ave.

CLEVELAND, 1831 Euclid Avenue.

DENVER, 1564 Broadway.

LOS ANGELES, 380 South Los Angeles St. SAN FRANCISCO, 423-433 Golden Gate Ave.

THE BIDDLE & SMART CO.

AMESBURY, MASS.

Manufacturers of highest grade Automobile bodies, Limousines, Landaulettes and Touring Cars

This square corner, side entrance body is of newest design and suitable for cars ranging in price from $2,500.00 upwards. We are prepared to furnish jobs of this type, carefully constructed and exceptionally well painted and trimmed, in large quantities for the best trade. Manufacturers needing efficient attention are invited to write for further information.

The Biddle & Smart Co.

50 HORSE-POWER

—or over—acting on a 2-ton car, and the resultant force of weight and energy grinding and wrenching the tires against rough road surfaces, is a problem that requires *extraordinary quality* to solve.

Long-continued tests under such conditions have been met and satisfied, the country over, by the

PENNSYLVANIA RUBBER RACING TYPE

Its shock-resisting strength, toughness, resiliency and wearing qualities are phenomenal. The tread is extra heavy—and flat, to resist skidding.

PENNSYLVANIA RUBBER CO.
JEANNETTE, PA.

General Sales Agent, ROGER B. McMULLEN, Chicago, Ill.

NEW YORK—1741 Broadway. CHICAGO—1241 Michigan Avenue
PHILADELPHIA—615 N. Broad St. ATLANTA, GA.—102 N. Prior Street
BOSTON—20 Park Square. BUFFALO—717 Main Street.
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Take This Battery

Test it against any other cell on the market
—it will prove its worth.

The

Red Seal Dry Battery

is made to meet the demand for a high class, high amperage cell and will stand the strain of the heaviest ignition service.

Has a high initial output and will maintain its average energy under all conditions.

For over fifteen years we have been making the MESCO—the standard telephone battery.

We also manufacture the MANHATTAN DRY BATTERY.
Adaptable to all purposes where a dry cell can be used.

Prices: Red Seal, 25c Manhattan, 15c Mesco, 15c

Get our Special Quantity Prices

This Battery is especially made for Gas and Gasoline. Stationary, Automobile and Marine Engine Ignition.
RED SEAL
DRY BATTERY
For Ignition
AND ALL OTHER WORK REQUIRING
High Amperage
Manhattan Electrical Supply Co.
NEW YORK. MAKERS CHICAGO.
Factories: JERSEY CITY.

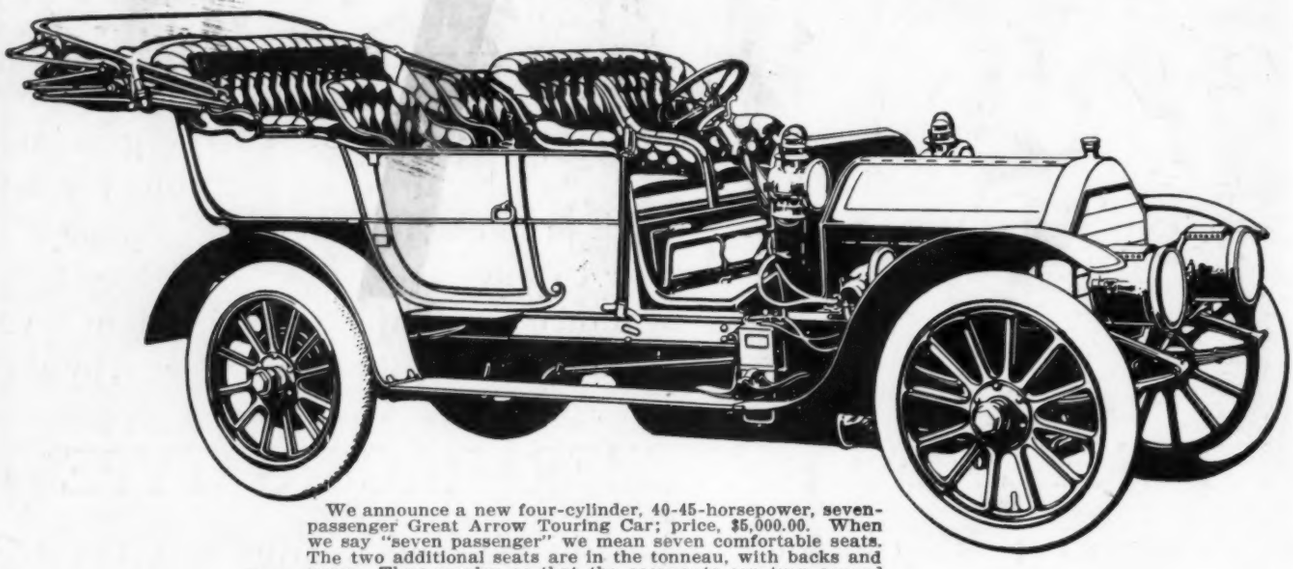
Held up as a model of modern battery making

MANHATTAN ELECTRICAL SUPPLY COMPANY

New York
17 Park Place. 14 Murray St.

Chicago
188 Fifth Avenue.

Factories:
Jersey City, N. J. Ravenna, Ohio.



We announce a new four-cylinder, 40-45-horsepower, seven-passenger Great Arrow Touring Car; price, $5,000.00. When we say "seven passenger" we mean seven comfortable seats. The two additional seats are in the tonneau, with backs and arms. They revolve so that the occupants can turn around and chat sociably with the three people in the rear. There is nothing exclusive about the idea. All good cars will probably adopt it.

"The Factory Behind the Great Arrow Car"

THE appeal of the Pierce Arrow is made upon something deeper and more vital than a change in the form of the body. It is in the car itself.

The 1907 Pierce car will be made in the new Pierce factory. We put it modestly when we say that this is the most complete automobile factory in the world. By "completeness" we mean not merely size, good location, shipping facilities and all those things; we mean especially a factory planned with the greatest care for the comfort and convenience of the workmen so as to produce such a car as the Pierce Great Arrow has always been and must continue to be.

The argument for 1907 will be "The Factory Behind the Great Arrow Car."

If we could, with comparatively meager factory facilities, make the Pierce Great Arrow what it has become, the American Car for Americans, then how much better can we attain our ideal with such an equipment as is furnished by the new plant, to say nothing of promptness in deliveries.

The George N. Pierce Company

Buffalo, N. Y.

Members of Association of Licensed Automobile Manufacturers

PIERCE DEALERS

J. W. Maguire Co.....745 Boylston St., Boston, Mass.
Harrolds Motor Car Co., B'way, 58th-59th Sts., New York, N. Y.
H. Paulman & Co.....1430 Michigan Ave., Chicago, Ill.
Banker Brothers Co.....Baum and Beatty Sts., Pittsburg, Pa.
Foss-Hughes Motor Car Co...201 N. Broad St., Philadelphia, Pa.
Ellis Motor Car Co.....222 Halsey St., Newark, N. J.
Bush & Shields.....953 South Main St., Los Angeles, Cal.
Mobile Carriage Co.....762 Gough St., San Francisco, Cal.
Broadway Auto Co.....Madison St., Seattle, Wash.
Tom Botterill.....1643 California St., Denver, Colo.
C. P. Joy Auto Co.....368 Minnesota St., St. Paul, Minn.
Pence Automobile Co.....717 Hennepin Ave., Minneapolis, Minn.
J. P. Schneider.....187 Jefferson Ave., Detroit, Mich.
Metropolitan Motor Car Co., 1841 Euclid Ave., N.E., Cleveland, O.
D. T. Williams Valve Co.....904 Broadway, Cincinnati, O.
The Zorn-Strauss Co.....518 Third Ave., Louisville, Ky.
Western Auto Co.....4701 Washington Blvd., St. Louis, Mo.
Palace Auto Co.....1408 Walnut St., Kansas City, Mo.
The Cook & Stoddard Co....22d and P Sts., Washington, D. C.
Southern Auto Co., Mt. Royal & Maryland Aves., Baltimore, Md.
Central Auto Station Co.....92 Renne Ave., Pittsfield, Mass.
E. R. Clark Auto Co.....117 Lyman St., Springfield, Mass.
Miner Garage Co.....High and Allyn Sts., Hartford, Conn.
Wilson & Co.....117 Craid St., West, Montreal, Canada
Wilson & Co.....142 Bank St., Ottawa, Canada
Automobile & Supply Co., Ltd., 24 Temperance St., Toronto, Ont.
Hibbard Auto Co.....187 Wisconsin St., Milwaukee, Wis.
U. S. Auto Co.....21 Plymouth Ave., Rochester, N. Y.
Utica Motor Car Co.....Utica, N. Y.
Troy Auto Exchange.....22 Fourth St., Troy, N. Y.
Standard Motor Car Co.....Scranton, Pa.
A. E. Lambert.....Titusville, Pa